Products finishing

HOWARD CAMPBELL, Editorial Director
FRED W. VOGEL, Managing Editor

Volume 2 | NOVEMBER, 1938 | Number 2

DON G. GARDNER
President and
General Manager

•

JOHN M. KRINGS
Advertising Manager

East
G. M. FILLMORE
JOHN VANDER VOORT
342 Madison Ave.
New York
Murray Hill 6-3899

Central West
J. H. KOCH
431 Main St.
Cincinnati, O.
Main 0182

West
GEORGE H. MEYERS
Tribune Tower, Chicago
Superior 8329

Member

CCA

CONTENTS

Metal Cabinets Finished in Air-Conditioned Department 7
By Carleton Cleveland

Test Machines for Organic Finishes 14
By Robert E. Wheeler

Barrel Finishing of Metal Products 24
By H. Leroy Beaver

Cyanide Fumes in the Plating Room 34
By Nathaniel Hall

The Finishing Forum
Simple Chromic Acid Concentration Tank 42
By E. A. Blount

Finishes That Aid in Appearance and Utility 44

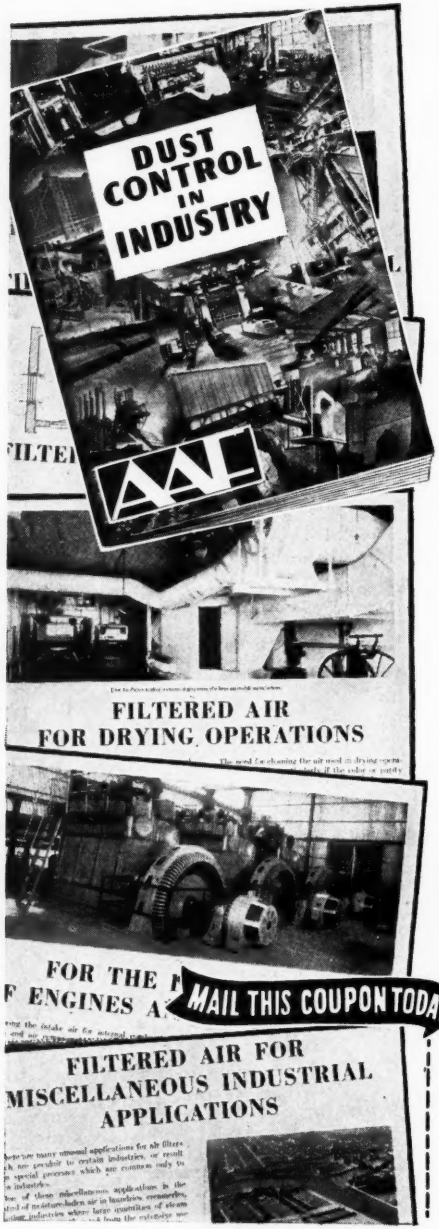
News of the Industry 46

New Plant Equipment and Materials 50

For Your Catalog Library 62

Index to Advertisements 64

Published monthly and copyrighted by
Gardner Publications, Inc., Business and editorial offices 431 Main St., Cincinnati, Ohio.
More Than 14,700 Circulation This Issue



This Vital Information is FREE!

One of industry's most troublesome problems is the control of dust both atmospheric and process. For 18 years, the efforts of American Air Filter engineers have been devoted exclusively to the study of dust control equipment to meet every type of dust problem. From its laboratories have come the most outstanding advancements in the air cleaning and dust collecting field.

The booklet illustrated deals with every branch of dust engineering. The information it contains is of inestimable value to plant engineers. In sending for this book there is absolutely no obligation—we are simply taking this means of bringing to your attention the equipment which is manufactured by the American Air Filter Co. for the solution of Industrial Dust Problems.

AMERICAN AIR FILTER CO., Inc.
122 CENTRAL AVE., LOUISVILLE, KY.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

MAIL THIS COUPON TODAY

AMERICAN AIR FILTER CO., INC.
142 Central Ave., Louisville, Ky.

Please send me without obligation your book—"Dust Control In Industry".

Name.....

Company.....

City..... State.....

Products Finishing

Cincinnati, Ohio

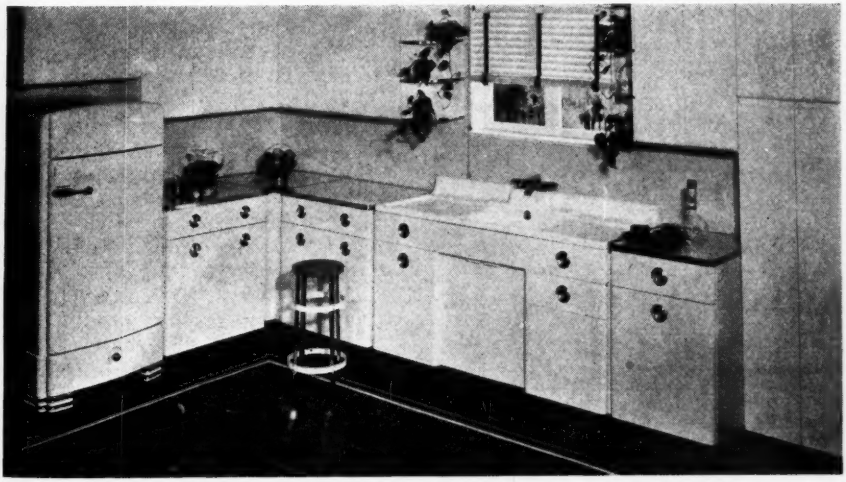
Vol. 2, No. 2

November, 1938

Metal Cabinets Finished in Air-Conditioned Department

By Carleton Cleveland

UTILITY and convenience are the order of the day. In the home and in professional offices, various types of cabinets adapted to specific needs have become more and more popular. The demand for the under-



Corner of modern kitchen showing cabinets and refrigerator, as displayed by Sears Roebuck & Company

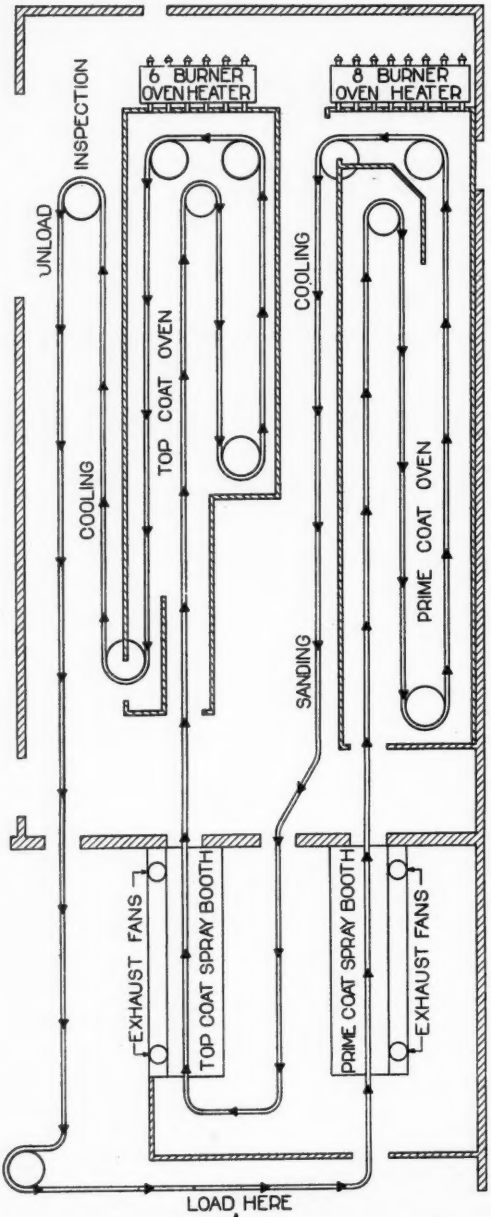


Fig. 1—Layout of finishing department, Hamilton Manufacturing Company.

the-sink cabinets, for instance, has progressed to the point where they are now being turned out in large quantities.

The Hamilton Manufacturing Company, Two Rivers, Wisconsin, who manufacture a complete line of various types of steel furniture for printers, drafting rooms, laboratories, engineers, doctors, dentists, and chemists, is now producing about 500 under-the-sink cabinets per day—finished, packed, and ready for shipment.

The fabricated steel parts are brought to the production line and assembled into cabinets on roller conveyors and then move toward a Blakeslee degreaser, where they are lowered by means of an electric automatic hoist which is designed to leave each unit in the degreaser just the right length of time. After the degreasing operation, it is automatically lifted out, clean and dry from the hot solution. Following this, it is tack ragged and then hung on one of the projecting hooks of a continuous overhead conveyor and thus carried through the various stages of the finishing process.

First, the cabinet passes through the prime coat spray booth where a Dulux prime coat is applied. From here it passes along into the Dry-Sys primer oven, which is maintained at a temperature of 430 deg. F. where the prime coat is baked on during the

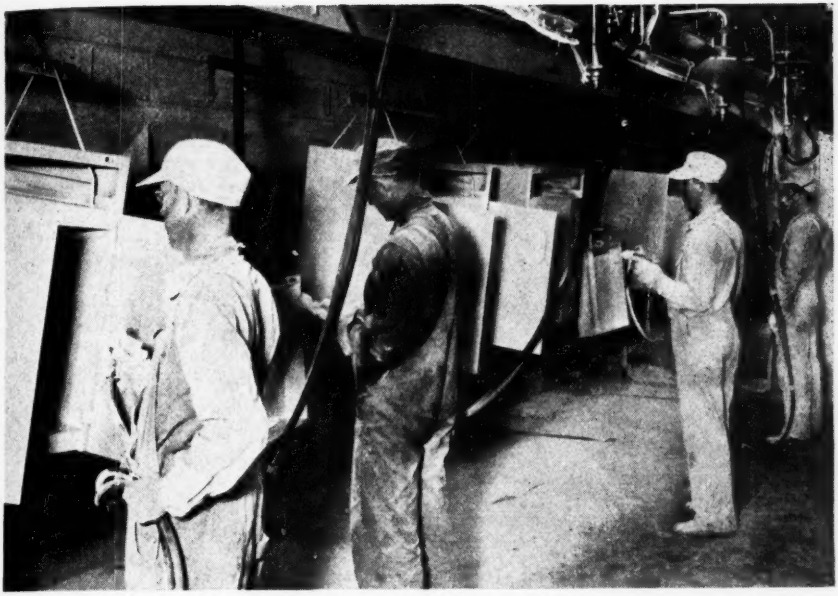


Fig. 2—Operators spraying finish on under-the-sink cabinets suspended from overhead conveyor chain as they pass through water-wash spray booth.

40 minutes that are required to travel through the oven. The cabinet then passes through a cooling zone where it is sanded and tack ragged. Continuing its journey, it passes through a top coat spray booth where a high bake Dulux coat is applied. From there is goes through the top coat oven (similar in design to the primer oven) to be baked for 40 minutes at 315 deg. F. Upon emerging from the second oven, the cabinet again goes through a cooling zone and then is transferred from the overhead conveyor to

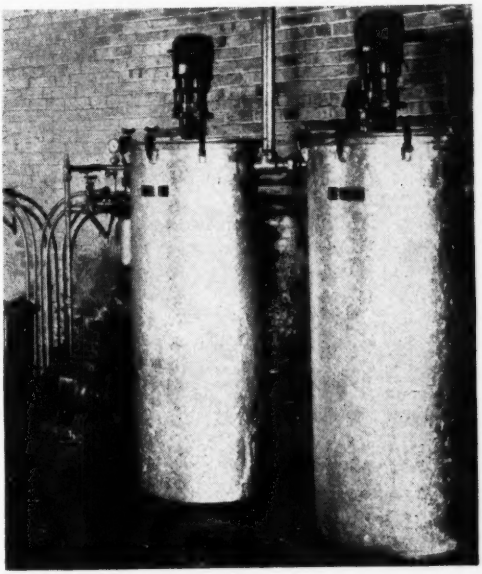


Fig. 3 — View of paint circulating room showing double tank system and pump for circulating the primer coat

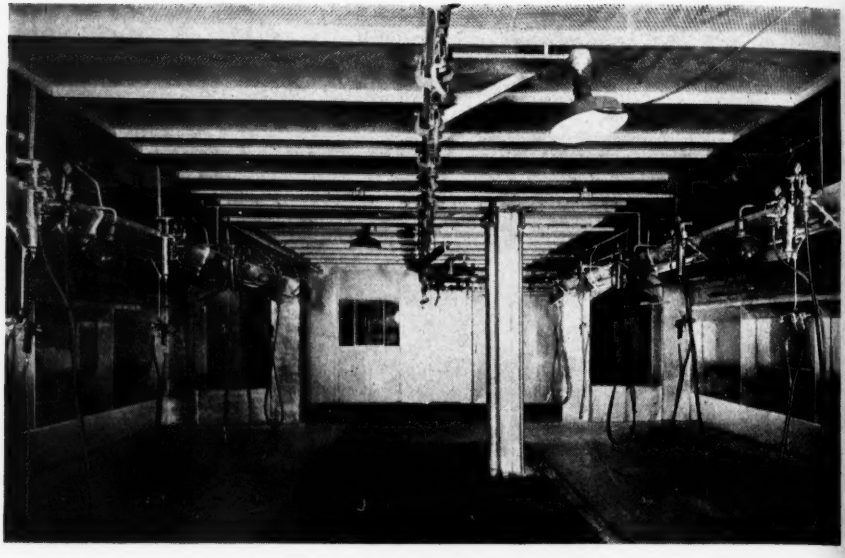


Fig. 4—General view of air conditioned spray room

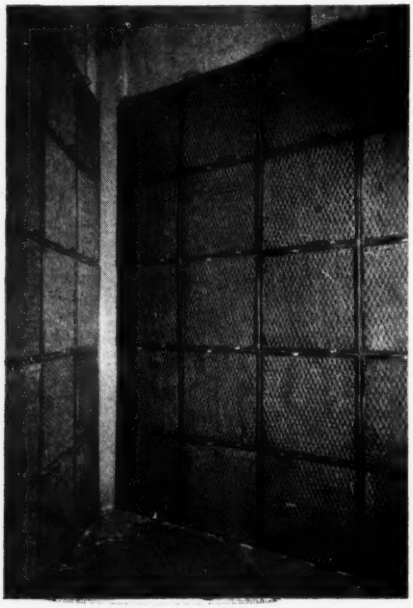


Fig. 5—Filter chamber for mixing air entering spray room

a gravity roller conveyor, where the final inspection is given and the trimming is done. The packing and crating is also done on this roller conveyor, after which it is ready for immediate shipment or delivery to storage.

For a closer observation of the finishing operations, it is necessary to start with the degreasing operation and then move on to the spray booths, of which there are two—one for the prime coat and one for the top coat. The spray booths are each 30 ft. in length and are divided into five compartments to accommodate five spray men to operate in each booth. These booths are of the water-wash type, installed by the Binks Manufacturing Company, Chicago. The overspray is

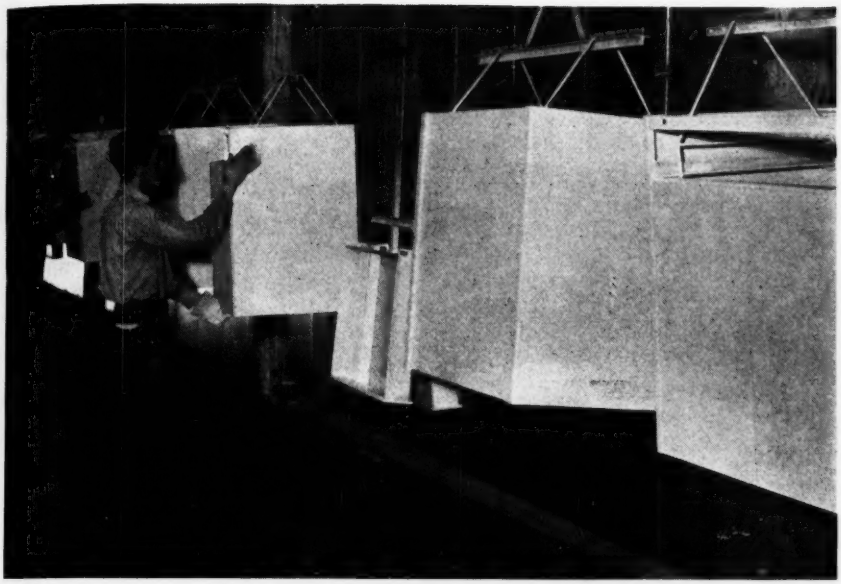


Fig. 6—Cooling and sanding zone alongside prime coat oven

carried through a curtain of water which captures practically all of it. This overspray is collected from the booths in the form of sludge and is reclaimed by dehydrating and re-treating.

Both booths are located in one glass enclosed room in which a Dry-Sys fresh air supply system is used to provide clean filtered air to the enclosed area. This air is under pressure to avoid dirt infiltration, and comes in at the top and goes out through the water curtains. The air supply is based on exhausting a maximum of 65,000 cu. ft. of air per minute. When the door is opened, air rushes out, preventing any dust-laden air from the outside entering the enclos-

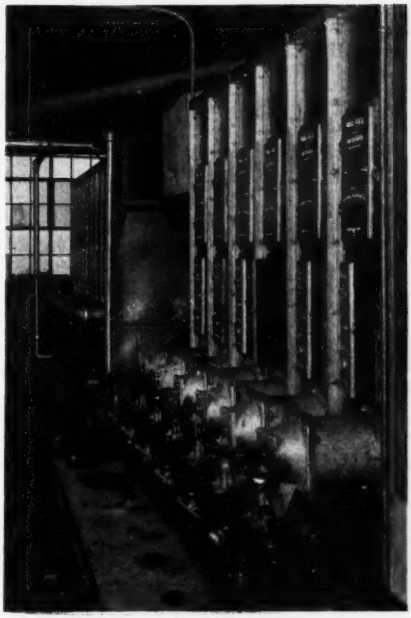


Fig. 7—General view of both heating units for drying ovens

ure, thereby insuring good clean work at all times.

The working height of each booth is 7 ft. and the overall is 9 ft. 2 in., the working depth is 7 ft., with an overall depth of 10 ft. 6 inches. There

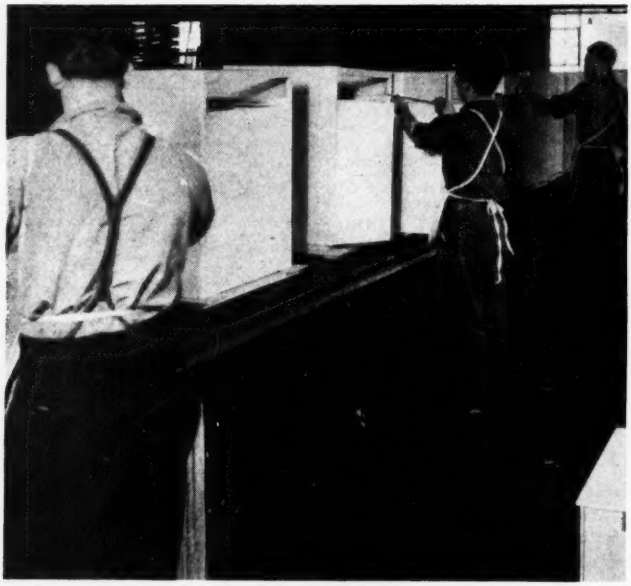


Fig. 8—Finished cabinets resting on base of packing crates as they travel along on the roller conveyor.

are openings at the sides of each booth to allow the overhead conveyor with the cabinets to travel through the booths. Extending the full width and depth of the washing chamber at the rear of the water curtain in each booth is a set of eliminating plates for retaining the free moisture from the air which is being exhausted, and thus holding the evaporation of water down to a minimum.

There are ten air conditioning units for conditioning the air line, together with ten Thor Model 7 spray guns, one provided for each section. Each section is also equipped with paint regulators and gauges designed to give equal pressure on each of the guns, forming the very heart of the paint circulating system.

The paint is piped to the spray booths from a central mixing room where the paint, in large mixing tanks, is being constantly agitated by motor-driven agitators. From the mixing tanks the paint is driven through filters, which keep it clean, and through the pipe line to the spray booths, by motor-driven pumps.

The ovens and conveyor chain were installed by the Drying Systems, Inc., Chicago, the prime coat oven being 17 ft. wide, 86 ft. long, and 8 ft. high, while the top coat oven is 22 ft. wide, 78 ft. long, and 8 ft. high. These ovens are insulated with rock wool encased in sheet metal. This insulation makes it possible to confine the heat within the ovens, so that men can work alongside the ovens without feeling the effects of the heat. The space between the two ovens is the cooling zone for the cabinets after leaving the first zone.

Both ovens are heated from a bank of indirect fired oil burning heaters which are completely equipped with all the necessary automatic controls and safety devices. Automatic controls shut off the supply of fuel in the main line in case of any emergency. The oven for drying the prime

coat has eight burners and that for the drying of the top coat has six. Duct adjustments make it possible to control the heat of the ovens from entrance to exit.

"Miccro Supreme Stop-Off Lacquers". This is the title of a 4-page folder describing stop-off lacquers for insulating plating racks that are used for decorative chromium plating and also for masking parts to be hard chromium plated. This folder is being issued by Michigan Chrome Company, 6342 E. Jefferson Ave., Detroit, Michigan.

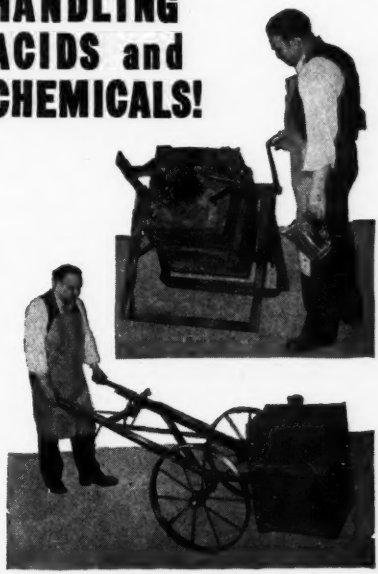
Miccro Supreme Stop-Off Lacquers have been applied to test racks and then immersed in alkaline cleaners at 212 deg. F. for as long as 500 hours of continuous immersion without affecting the coating. According to the manufacturer, the Miccro Supreme Stop-Off Lacquers will meet every protective coating requirement used with practically every known solution.

A copy of "Miccro Supreme Stop-Off Lacquers" will be sent free upon request.

Bristol Instrument for Telemetering Electrical Units Bulletin No. 424. An electrical unit such as volts, amperes, watts can be accurately measured and transmitted to a remote point by means of a Bristol Metameter, which is described in the Bulletin No. 424 now being issued by The Bristol Company, Waterbury, Conn. New features included in the design of these instruments have made it practical to apply this system of telemetering to electrical measurements, using standard measuring elements. They have now been adapted to measuring and telemetering electrical measurements of all magnitudes—from small millivoltages up to the totalized power output of power plants.

The principle involved has been used for a number of years by The Bristol Company in transmitting readings of pressure, temperature, flow, mechanical motion, and so on, from a transmitter at the point of measurement to a receiver, which is a recording or indicating instrument, at some distance away—a few feet or many miles. A cam, driven by a constant-speed motor gives the electrical impulses required to operate the system. This device is designed so that as it periodically engages and releases the pointer arm of the measuring element, no strain is placed on the element. Copy free upon request.

PREVENT ACCIDENTS SAVE TIME, LABOR HANDLING ACIDS and CHEMICALS!



PULMOSAN CARBOY TRUCK and TILTER

One man can now do the work of two, handling carboys and pouring acids or chemicals —without danger of strains, dropping, spilling and splashing. Worker simply rolls Truck under carboy handles, wheels it to the Tilter and automatically locks it thereon. Turns geared crank to pour any quantity gradually, steadily. Does not actually handle carboy. Both devices of welded steel. Write for further details and prices.

● **CARBOY DRAINER.** **Acid-proof spout, which fits all standard carboys. Prevents "gurgling", assures constantly smooth flow. Get details and prices.**

Pulmosan Safety Equip. Corp.

Dept. PF. **176 Johnson St., Brooklyn, N. Y.**

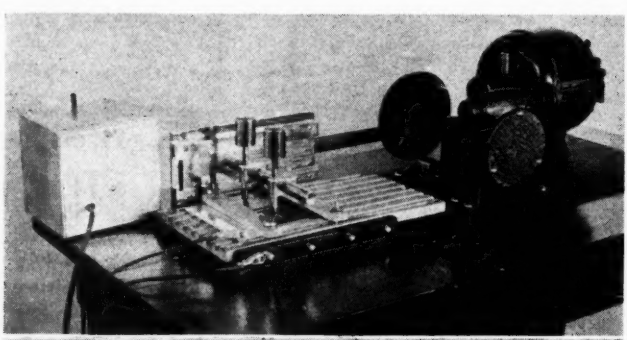
Test Machines for Organic Finishes

This article will be of unusual interest to those engaged in finishing metals who demand accurate methods for determining durability, thickness, mar resistance and adhesion or organic coatings.

By Robert E. Wheeler

FOLLOWING the adoption of quick-drying organic materials for business machines, there arose a need for devices to test this type of finish which would produce results similar to those obtained in actual service. At the present time, the General Research Laboratory Department of Underwood Elliott Fisher Company, Hartford, Conn., is now using four testing devices which were designed and built in this laboratory for the purpose of comparing special qualities of the organic finishing materials. These devices form the basis of the text of the following article.

In addition to the four which are illustrated and described herewith, are the salt spray, humidity and outdoor exposure tests which were found helpful in the comparison of different fin-



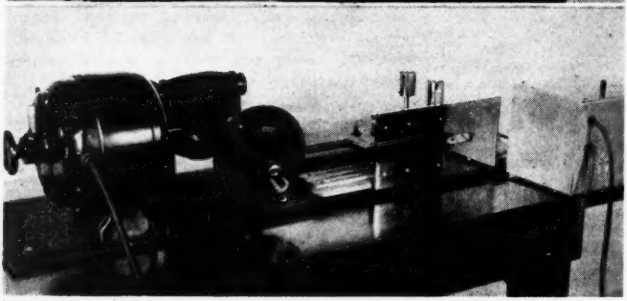


Fig. 1 — (Above) — Front view of a wear tester that consists primarily of an oscillating arm, a driving mechanism and two abrading tools. Fig. 2 — (Below) — Back view of the tester shown in Fig. 1.

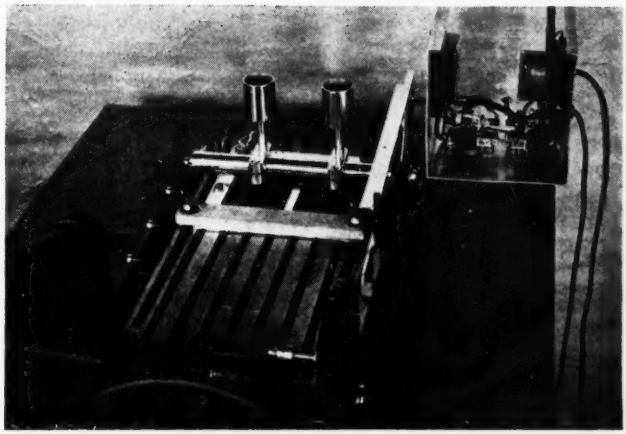


Fig. 3—Top view of the wear tester showing the unit completely assembled and ready for a test.

ishes, and in predicting to a limited degree what may be expected from the finish in actual use. As the need arises, additional testing devices will undoubtedly be designed to take care of the particular problem.

It is well to bear in mind when using a physical tester that it is extremely difficult to interpret the results in terms of actual use. Their value is from a comparative point of view, and translation into terms of length of life in the field should be made with the utmost caution. The ability to forecast the actual life of a finish comes only from long practice coupled with sound reasoning, the reasoning being aided by certain physical tests.

Wear Tester

There have been many wear testing devices proposed for the testing of finishes as applied to business machines. Various abrading materials have been used including felt, eraser, leather and various forms of ground abrasives. From experience, it has been found difficult to obtain results of reproducible accuracy. It is prob-

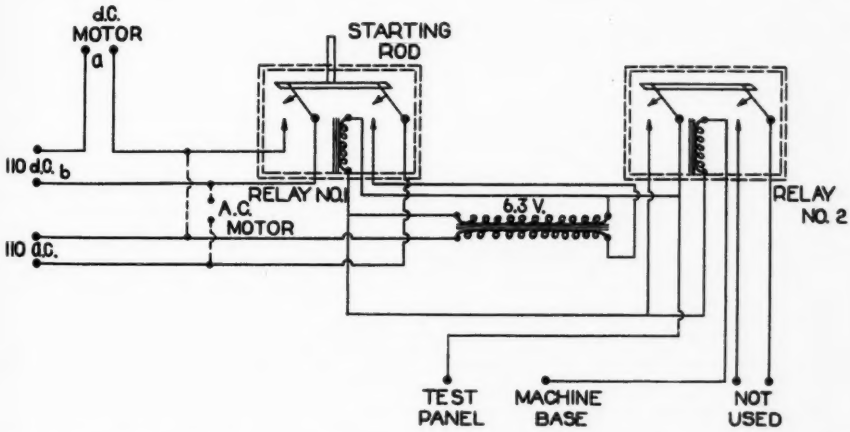
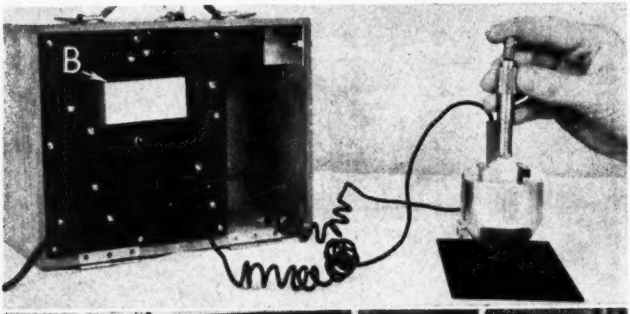


Fig. 4—Drawing which illustrates an automatic shut-off device employed to stop the wear testing machine the instant that the organic coating is worn through.

ably due to two causes: One, there may be particles in the abrading surface which cause uneven wear and inaccurate results and two, the device is not automatic so that it would indicate the moment the felt was worn through.



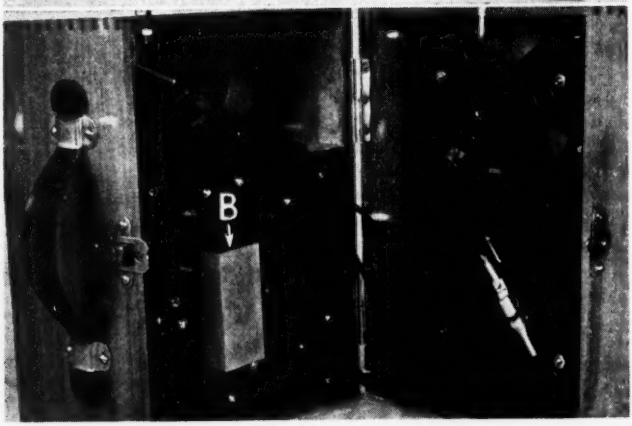


Fig. 5—(Above)—Illustration showing a film thickness meter that permits only a very minute amount of current to flow from the penetrating point to the test panel.
Fig. 6—(Below)—The film thickness meter is entirely portable and can be used to test specimens of practically every shape.

Three views of a wear tester which can be operated in a successful manner are shown in Figures 1, 2 and 3. The device consists of an oscillating arm which carries two abrading tools, and is actuated by a small motor through reduction gears and a driving arm. The gears give a reduction of 20 to 1 in speed which causes the tools to make 70 complete back and forward motions each minute. The length of the stroke can be varied by means of a slot in the drive wheel.

The tools of the wear tester are hollow cylinders tipped with a ¼-in. steel ball bearing which serves as the abrading mechanism. The ball bearing is fitted into the bottom of the hollow cylinders so that it will not turn, but it can still be driven out through the hollow stem of the tool for changing. The tools can be loaded with lead shot or some other weight so as to exert whatever pressure is desired on the specimen under test. The tester is equipped with an automatic device to stop the machine the instant the surface is worn through.

A Veeder-Root counter is also used to record the number of oscillations required to wear through the surface. An automatic shut-off is operated through a 6.3 volt transformer and two double acting, single relays. A diagram showing the construction of the automatic shut-off device is shown in Figure 4. There are two flexible leads for automatic control

EGYPTIAN
Industrial
FINISHES

For many years, over sixty in fact, The Egyptian Lacquer Manufacturing Company has specialized in making quality lacquers and lacquer enamels . . . Ever alert to the changing conditions and demands in the field of industrial finishing, we have gradually added other finishing materials to our original line of lacquer products until today we are prepared to furnish practically every type of industrial finish . . . Synthetics for spray, dip, and brush application, oil base finishes, maintenance finishes, varnishes, and a host of other products go to make up the EGYPTIAN line.

We will welcome inquiries from manufacturers interested in the latest developments in industrial finishes of all types.

The Egyptian Lacquer Mfg. Co.

Rockefeller Center
New York, N. Y.

EGYPTIAN
FINISHES

that are connected to the machine base and the test panel.

To conduct a test, a panel is placed under one or both of the abrading tools and clamped flat. The abrading ball bearing is rotated to a fresh spot on the ball and the hollow cylinder is loaded to the desired weight. The automatic shut-off is connected to both the machine base and the test panel, the reading on the counter recorded and the bakelite starting rod is pressed. This places the tester in operation after which it will remain in operation until it automatically shuts off at the time when the surface is worn through. The number of oscillations is then recorded as the wear resistance of the finish on the test panel.

The fact that only a D. C. motor was obtainable when the wear tester was designed rather complicated the wiring diagram, since two outlets had to be used, one for the D. C. and one for the A. C. If an A. C. motor is available, it can be connected as indicated by the dotted lines in Fig. 4, and outlets a and b can be eliminated. Using an A. C. motor would be the simplest and most desirable hook-up for most installations.

In operation, this tester has proved to be very satisfactory and is capable of giving reproducible results within an accuracy of 10 to 15 per cent.

Film Thickness Meter

Where a film thickness measurement device for organic coatings requires a relatively large current to flow from the penetrating point to the test panel, a high current will sometimes pass through the relatively low resistance of a thin portion of the film and cause the indicator to operate, thus giving an erroneous result. The film thickness meter illustrated in Figs. 5 and 6, together with the wiring diagram in Fig. 7, requires a very minute current flow from the penetrating point to the test panel. This is due primarily to the fact that the meter operates through the grid circuit of a simple triode tube.

As shown in diagram Fig. 7, the contacts a and b can be adjusted so that the meter will require practically a short circuit to force the grid positive and thus actuate the relay which

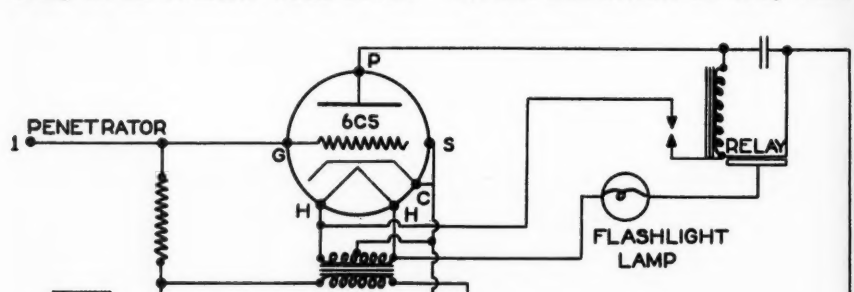


Fig. 7—Wiring diagram showing the connections and terminals of the film thickness meter

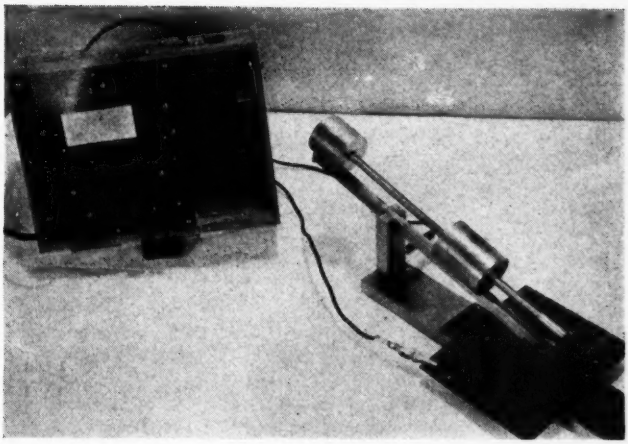


Fig. 8 — View of scratch tester showing a panel in position for a test.

causes an indicator lamp to light. The relay will operate on about 3 m.a. When terminals 1 and 2 are open, the grid is negative and no current flows through the relay coil, but the instant the penetrator makes contact with the test panel, the grid is thrown positive and current flows through the relay. A metal block B, shown on the front of the panels in Figs. 5 and 6, is supplied for the purpose of obtaining the zero point of the penetrator.

The penetrator, connected to the indicator and in actual operation on a test panel, is shown in Figure 5. The penetrator is a heavy steel cone tipped with a bakelite point to prevent it from making contact with the test panel. A depth micrometer is attached to the top of the cone with its measuring rod extending through the center hole of the cone and bakelite tip. The end of the measuring rod is drilled to accommodate an ordinary steel phonograph needle.

As the micrometer is turned, the needle is forced out of the bakelite tip and into the finish being tested. The indicator is connected between the needle and the test panel. As soon as the needle makes contact with the metal panel, the panel light flashes on.

To make a film thickness reading, the flexible lead from 1, as shown in Fig. 7, is connected to the penetrator. The penetrator is then set vertically upon block B with no other pressure being applied other than that of the device, and the micrometer is turned until the indicator light flashes on. This reading is taken as zero for the measurement. Without changing the micrometer setting, the penetrator is placed vertically to the surface upon the specimen being measured. The flexible lead from terminal 2 is connected to the specimen and the micrometer turned slowly until the light flashes on. The difference between this reading and the zero reading is the thickness of the film, which is read directly in thousandths or ten thou-

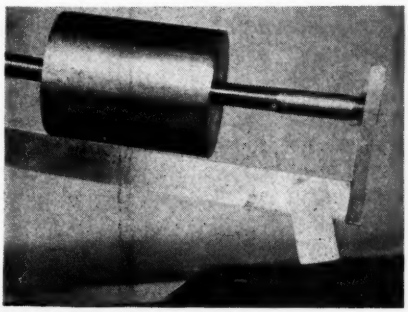


Fig. 9—A close-up view of the penetrating head and weight of the scratch testing machine.

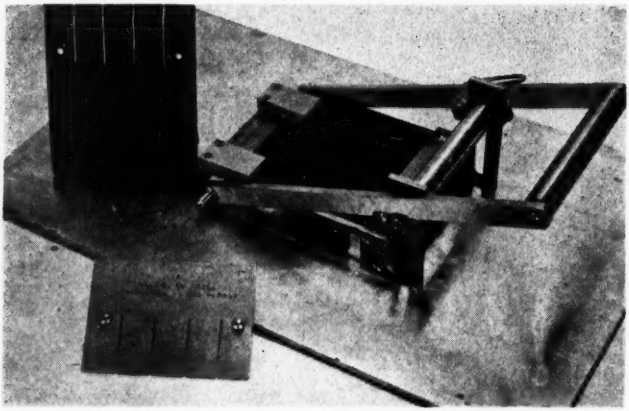


Fig. 10 — A general view of the bend testing device showing the roller which gives a true rolling action to the bend.

sandths, depending upon the micrometer used.

This meter has proved to be very accurate and has the advantage of being entirely portable, since the penetrator and all leads can be placed in a box 9½ in. x 7¼ in. x 6½ inches. It can be carried to any place in the shop, connected to any 110 volt 60 cycle outlet and it is ready for operation. In addition, it can be used on a specimen of any shape and the indicator can be used with other pieces of equipment such as the scratch tester which is next described.

Scratch Tester

Scratch testers of one form or another used for testing organic finishes have been in use for some time. The scratch tester illustrated in Figs. 8 and 9 has been found to be very convenient and accurate. The chief advantages of this type of tester lie in the fact that it employs the same mechanism which is used in the film thickness meter to show when the scratch is through the finish. The exact weight which caused the scratch to penetrate can be read from a calibrated lever. Since the operation of the mechanism of the scratch tester is identical with that of the film thickness meter, it will not be necessary to review it again.

Figure 8 shows a general view of the scratch tester showing a panel in place for test and the indicating mechanism attached. The device consists primarily of a weighted arm with a phonograph needle as a penetrator. Two weights are placed on a threaded rod so that they may be moved back and forth to vary the weight of the load. In the zero position, the lever on which the weights are attached is balanced so that there is practically no load on the penetrating needle, or in other words, so that the weight on each side of the fulcrum pin is the same.

The panel being tested is placed on an insulated bakelite platform with one terminal of the indicator being connected to the panel and the other to the frame of the tester. The large weight is then moved toward the penetrating end of the arm with the panel being dragged under the needle at each setting. When the red indicator light flashes on, the test is finished. The bar located beneath the threaded rod is marked off and calibrated in ounces so that the weight required to scratch through the finish can be read directly and then recorded.

A close-up view of the penetrating head and weight is shown in Figure 9. With this particular device, which merely requires the manipulation of two weights, a total of 26 ounces can

be exerted on the penetrating point. This is sufficient weight to scratch through practically any organic finish. However, if more weight is desired, it can be obtained by increasing the length of the lever arm from the fulcrum to the penetrating point or by increasing the size of the two weights.

Bend Tester

Testing an organic finish for adhesion by bending over mandrels of various diameters and noting the smallest diameter which ruptures the film has been used as a means of comparing finishes for many years. This is rather a tedious procedure since it requires several different bending operations. Ordinarily, this means that several panels must be prepared, or that one panel must be completely ruined to perform the test and additional panels must be made if further tests are to be run. A bend tester on which a panel can be passed over several different radii at the same time and yet preserve the panel for further test is illustrated in Figures 10, 11 and 12.

Figure 10 shows a general view of the bend tester showing the roller which gives a true rolling action to the bend and also the template for cutting the panels and a panel which is cut and finished. The template has slots cut in it approximately 1 in. apart to correspond to the bending blocks shown in Figure 11. There are also two holes drilled in each side of the plate so that the panels can be bolted together while they are being sawed. The template is of necessity case hardened. The panels used measure 4¾ in. x 6 inches.

When it is desired to prepare panels for testing, thin sheet steel is cut to the required size. Eight or ten panels are then clamped to the template and the two holes are drilled. A nut and bolt is then inserted in each hole to hold the panels together and a clamp is placed on each side of the slot to be sawed. The entire assembly is clamped in a vise and the four slots sawed out. The panel is coated with the material it is desired to test and is then fastened to the tester by means of a bar. Holes are drilled in this bar which correspond to the holes in the test panel and also the bending blocks. Two bolts which pass through the bar and the panel and which thread into the bending blocks are used to hold the panel in position while a test is being made.

Figure 11 shows a front view of the bending blocks which are ground to the following radii: ½ in., ¼ in., ⅛ in., 1/16 in., and 90 degrees. After inserting the panel as described above, the key which holds the handle in the up position is removed and the

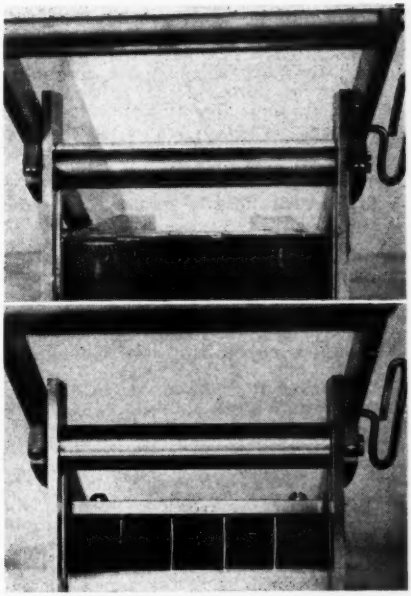


Fig. 11—(Above) — Illustration showing a front view of the bending blocks of the bend testing device which are ground to various radii.

Fig. 12—(Below)—Panel in the bend testing device after the bend testing operation.

handle is then pressed downward. This action forces the roller to roll over the faces of the bending blocks with enough clearance being allowed for the panel.

A sample panel after the bending operation is shown in Figure 12. The panel can be removed for inspection and the rupturing radius recorded. The bent end can then be cut off or the panel used as it is for additional tests. In constructing this type of tester, one must be sure that the bars which support the roller and handle are long enough so that the roller will describe nearly a straight arc across the faces of the bending blocks on the downward stroke.

"Stokes High Vacuum Pumps." This is the title of a handbook on vacuum practice and a catalog of high vacuum pumps which is now being issued by F. J. Stokes Machine Co., Tabor Rd., Olney P. O., Philadelphia, Pennsylvania. This catalog is well edited, profusely illustrated and excellently printed. The catalog is divided into five sections for describing five sizes of pumps from 10 cu. ft. to 225 cu. ft. capacity. It contains pump information of real value to anyone working with vacuum from 28 in. up to within a few microns of absolute.

The handbook section of the catalog is filled with data, charts, graphs and tables that will be of great benefit in reference files and engineers' libraries wherever vacuum, especially high vacuum, is used. Most of the data is original and has not been published before. All of the information is applicable in every-day practice and the technical data is translated into plain language that everyone can understand.

The Stokes High Vacuum catalog is a comprehensive presentation of the story of high vacuum, its applications, advantages and economies in industry. It illustrates types of equipment and describes vacuum practice applicable in chemical processing, distilling and for other purposes. It discusses selection and operation of pumps and auxiliaries, maintenance of equipment and systems and other shop problems. It is a compilation of authoritative data and information on vacuum practice that brings the reader up-to-date on the subject.

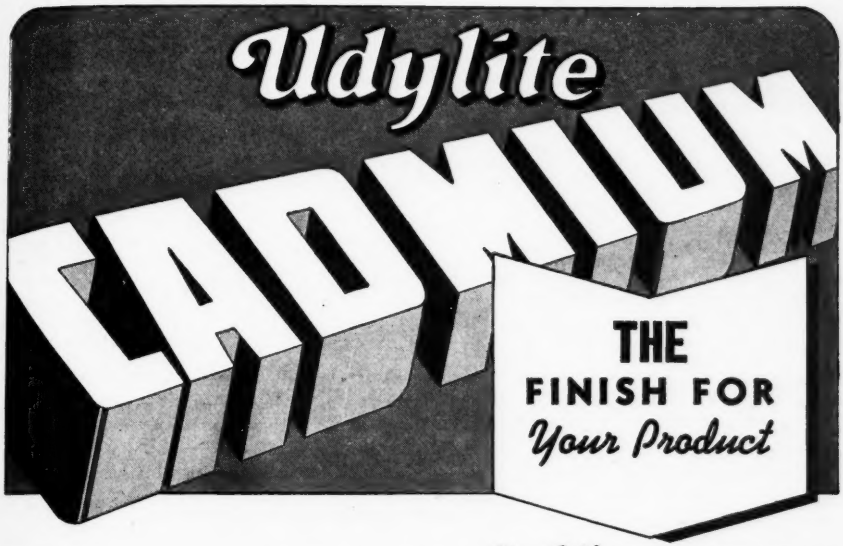
Copy of "Stokes High Vacuum Pumps" will be sent free upon request.

Electric Driven Direct-Connected Compressors. The developments and refinements accomplished in over thirty years of manufacturing direct-connected synchronous-motor-driven compressors are presented in a new 56-page catalog covering the class "PRE" compressors recently issued by Ingersoll-Rand Company, 11 Broadway, New York, New York. The "PRE" compressors, built in sizes

One of the many installations of "PRE" compressors illustrated in the Ingersoll-Rand Catalog No. 3426.

from 200 to 3000 H. P., utilize the constant speed synchronous motor which is said to be efficient at compressor speeds, and not only is valuable in correcting a lagging power factor produced by other motors of the induction type, but because of a large air gap, requires practically no bearing adjustment. These compressors embody the automatic Five-Step Clearance control method of regulation which cushions the inertia forces of reciprocating parts, thus materially reducing bearing loads and power line disturbances. The "PRE" is equipped with I-R channel valve, the characteristic of which is sustained and silent operation at high efficiency.

The new catalog itself embodies several unique features, notable among them being a 2-page chart devoted to the interrelation of the design of the compressor and its operation in service. More than 50 representative installations in all parts of the world occupy 20 pages of the catalog. Copies of this catalog can be obtained by writing Ingersoll-Rand Company, 11 Broadway, New York, New York.



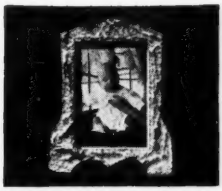
UDYLITE-CADMIUM is the trade name for pure metallic cadmium coatings applied to a very wide variety of metal products. The metal is applied by the Udylite Process, the simplest, most efficient method of cadmium plating known. Udylite-Cadmium is used where the combination of efficient corrosive protection and attractive appearance is desired at low cost.

Regardless of what finish you are using, investigate the possibilities of Udylite-Cadmium applied to your product. We will gladly plate any samples you send to us. ***The Udylite Company,*** 1651 E. Grand Blvd., ***Detroit, Michigan—New York,*** 30 E. 42nd Street; ***Chicago,*** 1943 Walnut Street; ***Cleveland,*** 3756 Carnegie Avenue; ***San Francisco,*** 114 Sansome Street.

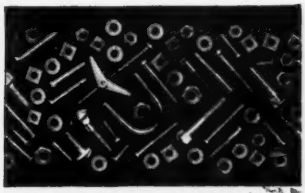
No Other Finish Offers ALL These Advantages

Rust Protection—Udylite-Cadmium is recognized as one of the best protective coatings available. **Beauty**—Udylite-Cadmium has an attractive, silvery-white lustre which is definitely appealing to the eye. It has a high tarnish resistance. **Economy**—Udylite-Cadmium coatings are not expensive because their application requires no polishing, buffing or coloring operations . . . because the coatings are easily and simply applied by the Udylite Process. **Easy to Solder**—Udylite-Cadmium coatings find a wide application because they solder easily with non-corrosive fluxes. **Broad Application**—Udylite-Cadmium may be applied to steel stampings, screw machine parts, forgings, castings; grey and malleable iron castings; and many non-ferrous metals without difficulty.

Udylite-Cadmium plated radio condenser chassis. Manufacturers of stamped steel parts prefer Udylite-Cadmium because of its rust protective properties, appearance and low cost.



This small casting is Udylite-Cadmium plated. The high covering power and the ease of application make it the ideal protective coating for castings.



Bolts, nuts, washers, fittings receive efficient protection against rust with Udylite-Cadmium. The coating is deposited uniformly on the threaded surfaces permitting positive operation.

Barrel Finishing of Metal Products

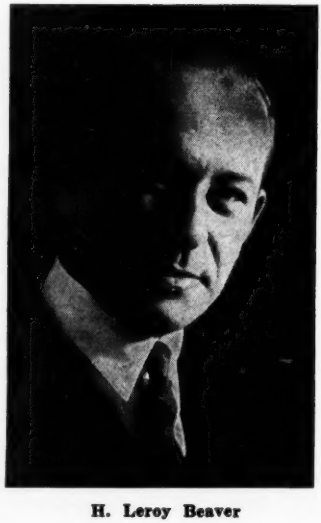
Nineteenth Article of Series — Cleanliness and its relation and importance in barrel finishing practice.

By H. Leroy Beaver

DURING the Twenty-Sixth Annual Convention of The American Electro-platers' Society held in Milwaukee in June of the current year, there was a paper presented by the Dayton, Ohio, Branch of the Society on "Metal Cleaning." This paper was read by Mr. Charles C. Conley and we wish to quote but one brief sentence from the paper as follows:

"In conclusion, we believe that metal cleaning practice has not kept pace with the rapid development in electro-deposition."

While we cannot speak with authority on this phrase as it relates to electro-deposition, we do heartily concur with the conclusion insofar as it relates to barrel finishing practice.



H. Leroy Beaver

It would be inevitable in a series of papers on a given subject that has run for twenty consecutive months that readers would present innumerable problems for solution in connection with their barrel finishing work, and it is surprising in how very large a number of cases the solution of the problem was found in the same important phase of the question as cleanliness.

Just why the opinion should prevail we do not know, of course, but platers in a great many cases will be sticklers for cleanliness of parts before either racking for still tank or automatic or for barrel plating, but will entirely ignore the same question in their barrel finishing operations prior to the actual plating procedure. Now it should be understood that a burnishing barrel is the poorest piece of mechanical equipment that could be installed in any plant for the purpose of metal cleaning, because its very principle of operation would defeat its use for such purpose.

Metal parts are barrel finished prior to plating for a two-fold purpose; first, to remove or smooth out burred edges by rounding them off to avoid sharp angles where it is not always

easy to secure good adherence of the plate, and, second, to alter the surface of the parts to a more level plane by effecting an alteration in the plasticity of the metal composing the part.

In speaking of steel stampings as an example, they do not respond in an exactly like manner in a barrel finishing operation prior to plating. Some firms may use what we would term a No. 1 finished strip, others a No. 2, and again others No. 3, perhaps safely indicative of the number of passes through the rolls, each of which provides a cleaner and smoother surface, and then again in all such strip material the grain size is a most important factor. Quite naturally the more times material has been passed through the rolls, the harder will be its surface finish or skin, and perhaps, too, due to intermediate cleaning operations of both rolls and strip there will be far less liability for any dirt, scale and so on, being rolled into the surface.

The lower grades of materials always present the greater part of the problems because lower price cannot supply other than lower quality. In this low grade material we meet with orange peel surface, areas of subsurface porosity, slag inclusions and unequal distribution or segregation of some of the elements composing the mix which, with the ordinary porosity of metallic materials, present the problems which necessitate as closely as possible absolute cleanliness, but this cleanliness must be observed prior to the barrel finishing operation as well as before the actual plating operation.

To illustrate a case in point we might mention an operator barrel burnishing steel stampings. Coming from the press shop the parts were covered not only with the original grease with which the material had been slushed at the mill, but also the die lubricating grease. Now, prior to the barrel burnishing operation the only thing done to these parts was to tumble them in an oblique tilting type barrel with saw-dust to absorb the excess of grease, and from this the parts went direct to the burnishing barrel. Here they were barrel burnished by using a soap solution made from a soap designed especially for laundry or household use, based on the supposition that "soap is soap", which of course is definitely not true in barrel finishing procedure. It is not surprising that with such a sequence of operations, performed as they were, trouble developed.

We always have maintained, and still do, that if as much research had been conducted on the selection and preparation of the raw material composing the parts and their fabrication as has been done on problems relating to the plating solutions and the methods and manner in which the plate is deposited, that many of the problems with which the plater is now faced would not exist. Certain it is that many of the difficulties now perplexing the average plater may be traced not to any fault in his solutions or the manner in which they are worked, but directly to the raw material in the first instance. There can be no denying that scores of fine proprietary cleaners may be purchased on the open market, but even the selection of the best of these, coupled with the most intelligent manipulation, will not overcome defects in the raw material as it is received from the mill. It was the author's own experience several years ago when he was engaged in the manufacture of steel balls for bearings that when trouble developed it was blamed on every department through which the material passed consecutively, but in the last analysis when the trouble was finally traced down, it was found to originate in defects in the raw material in the

first instance as received from the steel mills. Naturally, it took years of effective co-operation between the mill and the ball maker to finally iron out the troubles, and at this time American mills are producing the finest ball steel in the world. Pretty much the same form of procedure is now finally getting a start in the business of the manufacture of parts that are to be plated, but only determined insistence with the mill will eliminate the defects that now cause many of the troubles of the plater. An example of this will be found in the paper "Cold Rolled Steel for Plating Purposes" by Frederick Fulforth that appeared in the March, 1938 issue of **Products Finishing**, and to which the reader is now referred, because this paper is accompanied by photomicrographs which show the development of the refinement in grain size, and wherein it is demonstrated that a more expensive material is in truth and in fact cheaper when the final cost of the completed part is estimated.

Let us say that in the case of the operator described above that the steel he was using had areas of subsurface porosity, a common defect, and that the slushing grease had found its way into such sub-surface areas. The sawdust cleaning prior to barrel burnishing would not relieve this and the probabilities are that the area would be at least partially closed, rendering further cleaning difficult. If the parts had been first worked through a satisfactory cleaning cycle, either still or electrolytic, the chances would be far greater in favor of a more acceptable part reaching the plating tank. In other words, we contend that all parts intended to be barrel finished prior to plating should receive the identical treatment prior to the barrel operation that they ordinarily receive immediately prior to the plating operation. If the principles of saponification, emulsification, wetting and defloculation were more generally and more completely understood, many of the troubles both of the cleaner manufacturer and the plater would not now exist. The important factor of "surface tension", if properly understood, would enable us to provide solutions having a far greater power of penetration which would go far to solve the perplexing problem of cleaning sub-surface areas.

The indifferent cleaning of parts prior to barrel burnishing has another important bearing in respect to its effect on the steel burnishing materials. Even though saponifiable greases are used if an excess of this grease is carried into the burnishing barrel, unless a proper soap solution is used, there will be a very strong tendency toward the formation of "lime soaps" on the surface of the burnishing materials. If the soap contains an ingredient to act as a "wetting agent" and to reduce the surface tension, then the probability of the formation of such lime soap deposits is made more remote.

At ordinary temperature pure water has a higher surface tension than any other substance liquid, except mercury, and hence any other liquid when mixed with the water will have a tendency to reduce the surface tension of the water. Now pure water rates a surface tension of 80, but if alcohol is poured on the surface of water its surface tension will diminish to 25. Tri sodium phosphate, soda ash, rosin, and so on, when added to water naturally lower its surface tension, but in various experiments we have conducted we find that the addition of varying quantities of the sulfonated fatty alcohols as represented by such trade named products as Orvus and Dupinol, two of the so-called "soapless soaps", materially lower the surface tension and act as admirable wetting agents.

WRINKLE *Finishes*

A NEW WRINKLE in Wrinkle Finishes—thru producing better gloss and color than heretofore possible—has been developed in our *No. 70F-1* Fine Black and No. 70F-2 Coarse Black Wrinkle Finishes.

To insure uniform results they are shipped ready for use and are for spray application as received. The coatings should be baked for two hours at 250° F. An unusual characteristic of these materials, in contrast to most wrinkle finishes, is that they may be allowed to air dry a variable length of time before baking, without in any way affecting the final appearance or character of the wrinkle.

They produce *in a single coat* an extremely attractive and economical finish having good hardness and adhesion.

(Licensed by New Wrinkle, Inc.)

STANLEY

THE STANLEY CHEMICAL CO.

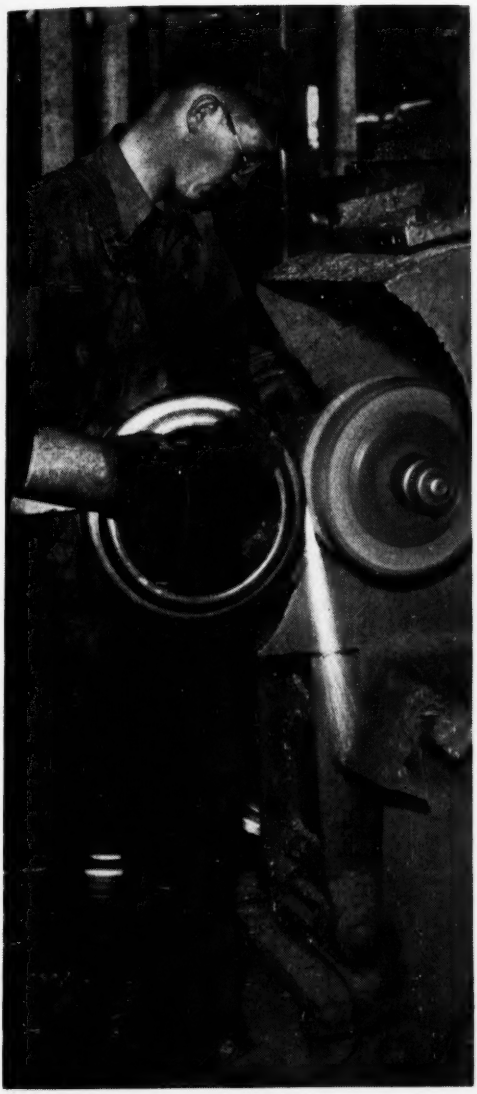
EAST BERLIN, CONN.

LACQUERS - SYNTHETICS - ENAMELS - JAPANS

A Subsidiary of THE STANLEY WORKS, NEW BRITAIN, CONN.

When considered in connection with the soapy burnishing solution, their addition definitely acts to prevent the formation of the lime soaps herein described.

We may regard the soap solution used as a vast conglomerate of bubbles. A soap bubble is simply a small quantity of soap suds spread out so as to expose a large surface to the air. As a matter of fact, such a bubble has two surfaces both of which are exposed to air. A bubble, therefore, must have some certain area of surface-energy depending on the area of the two surfaces. The sulfonated fatty alcohol we have previously mentioned, also known as "soapless soap", when agitated in either an acid or alkaline solution will develop a most profuse lather or suds, but none of these soaps have proven satisfactory when used alone with water as a barrel finishing lubricant solution. They do function very satisfactorily as wetting agents and for reducing surface tension, and their actions in connection with the burnishing soap solution seem to be that they fortify the solution by rendering the suds more tenacious in character. We would not recommend these sulfonated fatty alcohol soaps alone either in their dry or paste form for barrel burnishing operations. Perhaps the one drawback to their more extensive use is their price, as they are somewhat expensive as compared with most soaps supplied for barrel finishing application. We do, however, recommend the use of these soapless soaps as additions to other burnishing soaps. (We have previously stated that most soaps used in barrel finishing were primarily designed for household and laundry applications.) We have experimented with these soaps in the proportions of from ¼ of 1 per cent to a full 5 per cent and with our water condition we find that the addition of around 2 per cent provides very satisfactory results, and it is this latter proportion that we use in the most of our barrel finishing research test runs. This proportion, under average conditions, will provide a profuse lather or suds, which in many cases might prove objectionable and hot water rinsing seems, if anything, to intensify the lathering properties, while cold water will rapidly break down the suds and enable them to be rinsed away. If in using these soaps, the foaming is too profuse, then the quantity of soap used must be reduced. Practically all soaps will hydrolize when dissolved in hard water even though the hardness be only of a few grains per gallon. It might be desirable, therefore, in using sulfonated fatty alcohols to make up an aqueous solution which may be started by adding four ounces of the soap to a gallon of water. After this has been permitted to stand overnight, the sediment that forms on the bottom of the container will be the effect of the process of hydrolization. This does not indicate that inert or inactive ingredients have been added to the basis product as a filler for such is not the case. The clear liquid should be then poured or siphoned off, and the hydrolized portion discarded. In operating your burnishing barrel the customary charge of burnishing soap should be added and then about one pint of the liquid above described. This addition will have a tendency to greatly lower the surface tension of your burnishing soap solution and acting as a wetting agent will largely dissolve, by reason of its greater power of penetration, any film of grease that may have formed on your burnishing materials. It acts largely as a preventive to the formation of lime soap and, at the same time, renders a finished burnished piece of considerably higher character as regards cleanliness and sur-



If You Are Polishing Stainless Steel . . .

ALUNDUM ABRASIVE

QUALITY of finish is of vital importance when polishing stainless steel—not only because of the appearance of the product itself but because a surface with even minute pits or flaws tends to pick up impurities that will corrode and discolor the steel.

It is because finish is of such importance with stainless steel that Alundum Abrasive is so popular. The special shaping and sizing processes used in its manufacture give a fast-cutting, uniform abrasive without oversize grains to cause deep scratches difficult to remove.

You'll find that the "cost per piece polished" is lower with Alundum Abrasive.

NORTON COMPANY
Worcester, Mass.

G-79

NORTON ABRASIVES

face lustre. These lime soap deposits form more rapidly in hard water and are caused by undue quantities of calcium or magnesium in the water supply, and these elements react with the grease base of which the burnishing soap is composed.

The whole question of "wetting agents" and "surface tensions" is quite naturally embraced within the general study of capillary action.

Barrel operators who are careful about putting their parts through a cleaning process prior to burnishing have asked, in the main, two questions:

1. Why does the cleaning solution seem to act sluggish when permitted to cool, but again works more effectively when heated?
2. Why is it that when our cleaning solution does not seem to function properly that a small quantity of powdered rosin added to it seems to activate it?

The answers to both the above are, of course, embraced in "surface tension." It is well known that the degree of surface tension diminshes as the temperature rises, hence a hot cleaning solution will show a lower surface tension than a luke warm or cold solution.

Rosin and its derivatives are valuable in small quantities as wetting agents and also emulsifiers and their addition to a cleaning solution simply reduces the surface tension, providing greater penetration and making the action of the cleaner faster and more effective.

Now, in connection with the disposal of the soapy lather after the burnishing operation has been completed, we have before stated that lather is composed of bubbles and that a bubble has two surfaces, an inner and an outer, both of which are exposed to air and therefore has a certain amount of surface energy dependent on the area of these two surfaces. That energy is definitely present is indicated by the fact that if we insert a small tube into a bubble, we may blow air into it and increase its size and also its energy. Now, if the end of the tube that projects into the bubble is left free, the bubble will contract and force out some of the air but the fact remains that when supported by air from within and without a bubble definitely has surface tension which sets up a resistance to a rinsing operation for the breaking down of the bubbles of which the lather or suds is composed.

What we have said heretofore, of course, relates to the application of the addition of certain elements to lower the surface tension of a burnishing liquid (soap solution) as operated in burnishing barrel.

Much of the foregoing, however, may also be applied to additions to be made to the average alkaline cleaning solution as used either still or electrolitically. That parts should be cleaned thoroughly prior to barrel burnishing is certain, but we do not advocate that the same cleaning tank be used for this operation and the succeeding cleaning operation prior to plating. Two cleaning tanks should be used in the same sense that we use a double acid dip in bright dipping—first the "burn off" or "Black Boy" as it is often called, followed by the regular bright dip. It will be necessary to correct the solution in the first tank more often than in the second because it will more readily become contaminated by grease and dirt from the first operation. The sulfonated fatty alcohols may be used in both cleaning operations, but care must be used as to quantities because, especially in the electrolytic cleaning, the "soapless soap" will be found to foam excessively if too great a quantity is used. It does not require a very

large quantity to effectively reduce surface tension and provide wetting, and the smallest quantity that will effectively produce the desired result should be used.

Inasmuch as water conditions and the composition of the cleaner compound directly affect this, no rule will be laid down. The proper quantities must be determined by experiment by the individual operator. Indeed, many cleaner manufacturers are already adding "soapless soap" in one form or another and it will be well to determine this from your cleaner salesman before placing additional quantities in your cleaning solutions.

The point that we wish particularly to stress is that **absolute cleanliness is essential,** with all the force that phrase may be made to denote. We assure you that if the suggestions herein contained are adhered to that you will have more effective burnishing results, secure better adherence of the plated surface with a consequent lowering of the quantity of rejected parts—all of which are highly desirable in any manufacturing cycle where barrel finishing has a part.

Polymerin Brochure

"The Answer Is Polymerin" is the title of a catalog which is now being issued by Ault & Wiborg Corporation, 75 Varick St., New York, New York. In this catalog is described the interlated research through which Polymerin was developed.

Brochure Describing Polymerin

Polymerin is the industrial finish that can be applied to lamps, hardware, home laundry equipment, metal furniture, service station standards, office equipment, undersink cabinets, shower stalls, coated wire, vending machines, electrical appliances, toys, coolers, bicycles, scales, boiler jackets and other products.

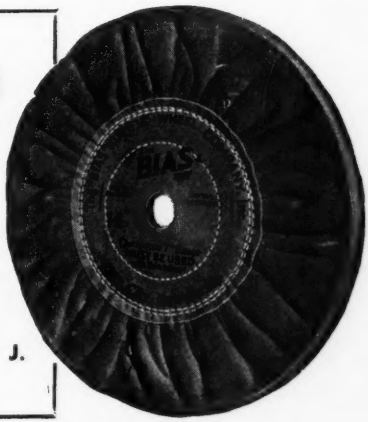
Polymerin is said to employ a unique chemical principle which accounts for its tough, unusually flexible film, and yet permits amazingly short production schedules.

A note on your company letterhead will bring you the catalog "The Answer Is Polymerin" without obligation.

An easy Buff to use - operators like it!

This Regular Type Buff cuts fast and thoroughly. Hard pressure is not required. The buff will not pull, nor tire the operator's wrist when light pressure is used. With less physical effort, nearly double the work can be produced—and at less cost than with any ordinary buff. Prove this fact by trying our Regular Type Buff in your polishing room.

BIAS BUFF & WHEEL CO., INC.
430 Communipaw Ave., Jersey City, N. J.
Canadian Agents: LEA Products Co., Ltd.
686 Notre Dame St. West, Montreal, P. Q.



Cutting or polishing with a buff causes friction, friction means heat, heat deteriorates the buff and wastes the composition.

The circulation of air through AIRWAYS Keeps it cool.

Cloth construction on the bias.

HALF AS MANY SECTIONS REQUIRED

WEARS TWICE AS LONG COSTS HALF AS MUCH

JACKSON BUFF CORPORATION

21-03 41ST. AVENUE • LONG ISLAND CITY, N. Y.

Airway Ventilated Buff

5 FEATURES "AIRWAY" COOLING

1. Permits 50% to 100% higher speeds.
2. Faster cutting and does not ridge the work.
3. Eliminates burning.
4. Raveling eliminated, requires no raking.
5. Saves compound.

Airway Buff Requires No Raking

Cyanide Fumes in the Plating Room

By Nathaniel Hall, Ch.E.

THE operation of any solution which has a cathode efficiency of less than 100 per cent gives rise to the evolution of hydrogen gas. Depending on the type of solution and the current density, the hydrogen may be evolved as fine bubbles which do not even disturb the surface of the bath, such as in the case of silver solutions, or the gas may be evolved in such quantity that it reaches the surface of the bath with explosive force and gives rise to a spray of solution, as is the case with brass and chromium solutions and cyanide pickles and strips. Some of this fine spray or mist drops back in the solution and some of it becomes suspendeed in the atmosphere of the plating room contaminating the air with the various chemical compounds of which cyanides are the most dangerous.

In this article, the author explains a simple method whereby the cyanide content of plating room atmosphere may be determined and the results studied as part of a procedure towards eliminating the health hazard of cyanide fumes.

In the past few months the subject of exhausting the fumes from cyanide plating solutions has been slowly entering the limelight. Some State Departments and especially in the states of New York and New Jersey have lately begun to concern themselves with the possible health hazards connected with the operation of cyanide plating solutions and in some cases have demanded the installation of suitable means of exhausting the fumes from these baths.

Let us state here and now that we do not approve of an antagonistic stand in such a situation by a plating shop owner or official. The State Boards are staffed by men who have as their jobs the protection and health maintenance of workers and all their efforts are in this direction. Because business men sometimes lose sight of this fundamental purpose of these boards, they feel that they are unjustly discriminated against and are martyrs to political expediency. This is not so and we can state from our experience that we have always found a sincere desire on the part of Boards to cooperate fully at all times and to avoid placing undue hardship on the employer if a health condition can be eliminated in any other possible way. However, it is of course necessary to prove that no health hazard is present before a retraction of a Board order can be expected.

It is not enough to maintain that deaths due to cyanide poisoning are practically unknown in the plating industry. The boards have the power to enforce improvements in any case

which affects the general well being of the individual and as in the case of dust and silica laden air, where there are usually no immediate symptoms and it is difficult if not impossible to anticipate the effect of present continued exposure on the future health and life expectancy of the individual, they are justified in taking precautions. It is not enough to prove that none of the men in the plant are at present or ever have been affected by any cyanide fumes which might be present in the plating room.

The fact that employees have never been caught in a machine is no argument against guarding off the moving parts if there is some possibility of danger. The only argument against an order calling for the installation of exhausts is to show that no health hazard exists under the worst conditions in a plant, namely just above the cyanide plating solutions when they are in full operation. It is the purpose of this article to explain the procedure whereby the cyanide content of the plating room atmosphere may be determined and the results may be studied in order that no one need be in darkness as to any possible health hazard from this cause.

In laying out this procedure it was kept in mind that the apparatus should be easily assembled and simple to operate so that these factors would not be a deterrent to practical platers. Of course, the equipment should be inexpensive in order to broaden its field of application to include small shops, and portable so that it may be moved from one place to another without too much trouble.

The process in outline involves the passing of a known volume of air through a solution in which the cyanide is absorbed. This solution is then analyzed for the cyanide content and the volume of air being known, the cyanide content of each cubic foot of air is readily determined. The requirements therefore will include a device

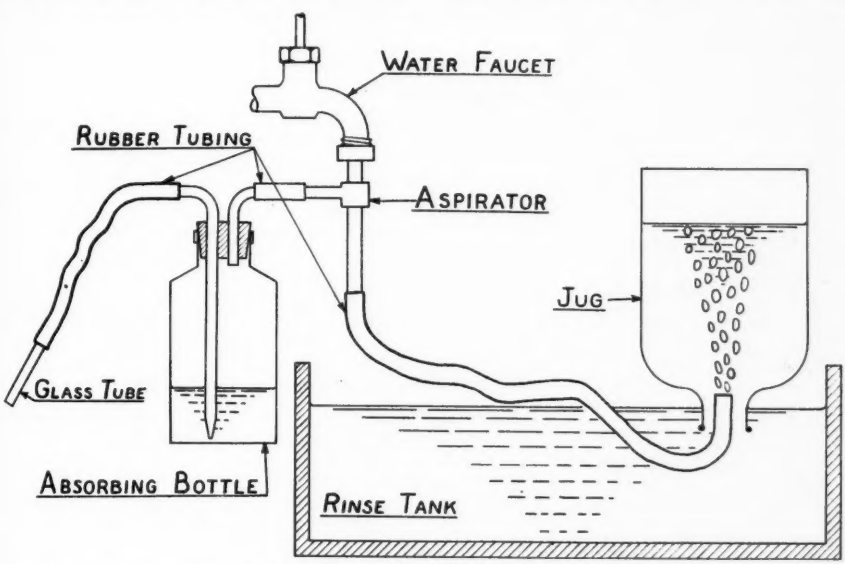
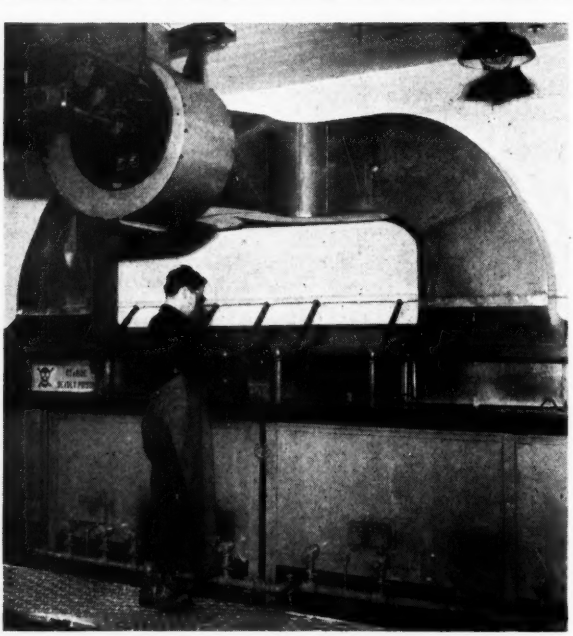


Fig. 1—Drawing showing the equipment and manner of arrangement for making the cyanide fume determination.

for absorbing the cyanide from the air, a pump for drawing the air through the absorber and a means of measuring the amount of air taken for the test. Among the devices which were considered for drawing the air through the absorbing apparatus were a mechanical pump, an air ejector and a water aspirator or pump. The mechanical pump was eliminated because of the cost and because of the difficulty of measuring the air volume without expensive meters.

The air ejector was considered because of the availability of compressed air in most shops but was rejected because of the difficulty of measuring the air volume. The water aspirator was chosen for this procedure because it can be purchased from any supply house for a few cents and can be mounted on a cold water faucet or outlet with a threaded end in a few moments. A suggested arrangement of the equipment is shown in Fig. 1. Whereas the air ejector or pump requires a dry gas meter for measuring the air volume, in the case of the water ejector the volume can be measured very easily by two men as follows:

A length of rubber tubing is connected to the pressure side of the aspirator. A bottle of known capacity such as a gallon jug is filled with water and inverted in a water rinse tank with the neck immersed about 1 inch. Since gallon jugs usually hold more than one gallon when full, the jug should be weighed both full and empty and the cubic capacity determined as shown in the test record Fig. 3 by subtracting the two to get the weight of water and then dividing the difference by 62.5 to get the volume in cubic feet. At a given signal, the end of the rubber tube is placed in the bottle and the time required for



Acid Resisting Fume Duct

Plating and other finishes on telephone equipment suitable for renovating must first be stripped off before new finishes can be applied. Inconel fans and hoods and Monel ducts are used to carry off the fumes from the cyanide and acid solutions in which this is accomplished at the plating department of the Western Electric Company, Brooklyn New York.

(Photo Courtesy The International Nickel Company, Inc.)

the air to force out the water is noted. The rate of flow is then computed. Two precautions are necessary for accurate results. First, the water pressure must be constant during the run or else tests should be made of the air flow at short intervals and averaged. Secondly, the neck of the bottle must not be immersed too far in order that the air inside may be at atmospheric pressure.

The gas absorption bottle employs the impinger principle as described by Bloomfield and Blum in their paper on "Health Hazards in Chromium Plating" *(1)* except that instead of using an impinger plate underneath the gas intake tube in order to disperse the air stream and break it up, the tube is brought to within ¼ inch from the bottom of the bottle. As shown in Fig. 2, the bottle is an ordinary 16 oz. wide mouth type which requires a No. 8 rubber stopper. The glass tubing is 8 mm. O.D. and the impinger is drawn down to about 2.5 mm. in order to impart a high velocity to the air. 200 cc. of distilled water are placed in the bottle for each test.

Determination of Cyanide Content

Two men are required to run a test. The apparatus is assembled as shown in Figs. 1 and 2, and the water ejector is connected to the cold water line over the nearest rinse tank. A length of rubber tubing is used to conduct the air from the tank to the absorber and from the absorber to the pump. The water is turned on and the rate of flow is adjusted so that the gallon jug is emptied, as described above and as shown in Fig. 1, in about 20 seconds. While this test is being made the man with the watch holds the gas intake tube over the plating tank in order to duplicate all conditions of the actual test. When the water rate has been adjusted to the desired flow, the absorber bottle is washed out and filled with 200 cc. of distilled water. When ready for the test, the bottle is mounted in place so that when the rubber stopper is placed in the neck, the flow of air from the tank begins. This moment is taken as the start of the test. When the air has bubbled through the bottle for exactly five minutes, equivalent to 2 cubic feet of air, the stopper is removed, thus interrupting the flow of air immediately.

Because of the small amount of cyanide collected, the ordinary analytical procedures are not satisfactory and a colorimetric method of analysis must be used, matching the color of the unknown solution against known samples. The procedure is to transform the cyanide to thiocyanate by treating with sulfide and then adding ferric chloride to the solution. The depth of the resulting red color is proportional to the concentration. This method is very sensitive and will give a distinct coloration in the presence of only 0.000004 gms. of

BETTER DEPOSITS
FEWER REJECTS
CONTINUOUS PRODUCTION
. . . use Harshaw Anodes and Chemicals
THE HARSHAW CHEMICAL CO.
MANUFACTURERS, IMPORTERS, MERCHANTS
CLEVELAND, OHIO AND PRINCIPAL CITIES

cyanide in a 10 cc. volume of water (2).

The solution in the absorption bottle is washed into a 400 cc. low form beaker. One cc. of yellow ammonium sulfide and 5 drops of 10 per cent

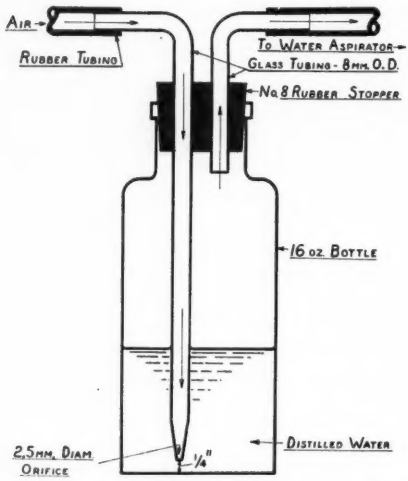


Fig. 2—Illustration showing absorption bottle.

sodium hydroxide are added and the whole evaporated to dryness on a water bath. The residue is washed into a pH comparator tube with a small amount of water, 3 drops of hydrochloric acid are added to make the solution faintly acid and the tube is filled with water to the 10 cc. mark. Five drops of 10 per cent ferric chloride solution are added and the mixture is allowed to stand for 5 min. A deep red color indicates a dangerous concentration of cyanide. The cyanide content is determined by comparing the sample with standards containing various amounts of standard sodium thiocyanate solution which must be prepared at the same time as the unknown since the color is not permanent. The standard thiocyanate is prepared by dissolving 3.1 grams of sodium thiocyanate in a liter of water. This is then standardized against standard silver nitrate until it contains 3.00 grams per liter of sodium thiocyanate which is equivalent to 1 milligram of HCN per cc. Varying amounts of the standard are added to the comparator tubes which are then filled to the 10 cc. mark with distilled water. Five drops of the ferric chloride indicator are added to each and the colors compared to that of the unknown thus determining its cyanide content. (3) (4).

Interpretation of Results

The action of the cyanide salts is practically the same as that of the acid but neither the potassium or sodium salt is as toxic as hydrocyanic acid, which is what we would expect due to the lower equivalent cyanide content; the minimum lethal dose being approximately 0.8-1.0 milligrams of hydrocyanic acid for each kilogram of body weight, corresponding to about 60 to 80 milligrams for an average person. (5).

Cyanide poisoning results in internal suffocation in the presence of abundant supply of oxygen by preventing the normal reduction of the oxyhemoglobin in the blood. This is shown by the cherry red color of the venous blood which is ordinarily dark. The effect may be extremely rapid, with no warning at all; a stage of convulsions and coma passing quickly into death or the attack may be preceded by warning symptoms such as irritation of the eyes and mucous membranes, and a sense of pressure and pain in the head, even nausea, vomiting and diarrhea. (6). In milder poisoning, the symptoms are those of moderate oxygen starvation such as is sometimes evidenced by mountain climbers and aviators, and they pass over usually fairly promptly. In some cases the symptoms appear in factory workers every day and then pass off when they leave

work and go out into the open air. The toxic effects of cyanide, unlike lead, are not cumulative and chronic poisoning from hydrocyanic acid and cyanides is a medical rarity. (7). Tests have shown that hydrocyanic acid is rapidly changed in the body and is excreted in part as thiocyanate in the urine. (8).

Fumigators often become insensitive to appreciable concentrations of cyanide after working at the trade for some time. The Public Health Service has shown by tests, however, that 500 p.p.m. (parts per million) of hydrocyanic acid in air can be breathed by a man for 1 minute without injury, 375 p.p.m. for 1½ min. and 250 p.p.m. for two minutes. Holtzmann, Lehmann and Flury found that 100 p.p.m. was the utmost limit that should be permitted for continued exposure. (9). The Bureau of Mines has a rule that an experienced man without a gas mask may be allowed to enter a room that has been fumigated with cyanide if the air contains no more than 100 p.p.m., the concentration being tested roughly in the field by means of sensitized papers according to the procedures of Katz and Longfellow. (10).

The plater is exposed to two types of atmospheres at his work. When hanging work into the tank and when removing it he is exposed to the maximum concentration because of his position at the source of the air contamination. However, he is not exposed to this condition continuously. When not standing over the tanks, he is exposed to the general atmos-

Date: May 12, 1938.
Time: 10 A. M.
Place of Test: Cyanide ZINC tank. Air intake about 9 inches above solution level, 44 inches above floor.

Temperature: At intake ..... 88 deg. F.
Solution ..... 149 deg. F.

Capacity of Jug:

A. Wt. filled with water 11 lbs. 13¾ oz.=11.86 lbs.
B. Wt. empty 3 lbs. 6½ oz.=3.41 lbs.
C. Wt. of water (A—B)..... 8.45 lbs.
D. Capacity (C/62.5)..... 0.135 cu. ft.

Air Passed:

E. Time required to empty jug..... 21.6 seconds
F. Rate of flow (Dx60/E)..... 0.375 cu. ft. per min.
G. Duration of run..... 5.00 min.
H. Total volume passed (FxG)..... 1.88 cubic feet

Chemical analysis:

I. Cyanide content as HCN..... 0.00084 gms.
J. HCN per cubic foot of air..... 0.00045 gms. per cu. ft.
K. Air density taken as 31 gms. per cu. ft.

HCN Concentration: 0.00045x1,000,000/31=15 parts per million.

Fig. 3—Method of keeping record of sample tests.

phere of the plating room under what might be called continuous exposure conditions. In most cases, the general atmosphere in the plating room will contain very small quantities of toxic gases because of the operation of various exhausting fans such as are used for bright dips, chromium plating, buffing or lacquering and which are usually run in conjunction with the plating room.

Although less than 100 p.p.m. of hydrocyanic acid is considered safe for continuous exposure, it is our opinion that in order to be on the safe side this figure should not be exceeded at face level over any of the cyanide tanks even though the exposure is not continuous. If the limiting concentration for continuous exposure is exceeded at these points exhausting ducts should be installed to provide an air velocity at the face of the duct of about 1500 feet per minute.

It is not part of the administrative policy of State Departments to impose undue hardship on the industry but rather to administer the safety laws as fairly as possible. It is to the interest of the employer to operate his plating room safely and the installation of exhausts where necessary is always an investment which returns quick dividends in increased efficiency and improved morale. If, on the other hand, cyanide fumes do not constitute a hazard in the plating room, the results of a chemical analysis will prove this point and will go far in sustaining the contention that no exhausts are necessary and would be an unwarranted expense.

References

(1) *Bloomfield & Blum, Public Health Reports, Vol. 43, No. 36, pp. 2330-2347, Sept. 7, 1928.*
(2) *G. W. Anderson, J. Soc. Chem. Ind., 36, pp. 195-6 (1917).*
(3) *Link & Mockel, Zeit. Anal. Chem., 17, 455 (1878).*
(4) *Snell, Colorimetric Methods of Analysis, Vol. I., pp. 125-6 (1936).*
(5) *A. Hamilton, Industrial Poisons in the U. S., p. 344 (1925).*
(6) *R. von Jaksch, Die Vergiftungen, 2 Ed, 1910 (Vienna).*

Down the Line

A close-up view of a Mahon down draft Hydro-Filter Spray Booth recently installed at the Studebaker plant. Note perforated washed air duct which provides a gentle down pressure of clean fresh air directly above the work. Note also the continuous grille on either side of the conveyor line. All fumes and overspray are drawn straight downward and away from the workmen and out through these grilles.

(7) *C. I. Reed, J. Lab. & Clin. Med.*, 5, 512 (1919-1920).
(8) *Hunt, Reid & Gettler, Legal Medicine & Toxicology*, 674 (1923).
(9) *A. Hamilton, Industrial Toxicology*, pp. 153-4 (1934).
(10) *S. H. Katz & E. S. Longfellow, J. Ind., Hygiene*, 5, 97 (1923).

Cadmium Plating on Steel. Of special interest to metal-working plants where cadmium plating is a regular production operation is an interesting feature article entitled "Cadmium Plating on Steel" appearing in the latest issue of Oakite News Service, published by Oakite Products, Inc., 20 Thames St., New York, New York. This illustrated article is a concise review describing cadmium plating practices and methods of preparing steel for the plating bath. Among the essential factors considered are cleaning of work before plating, location of heating coils in tanks, and rinsing after cleaning.

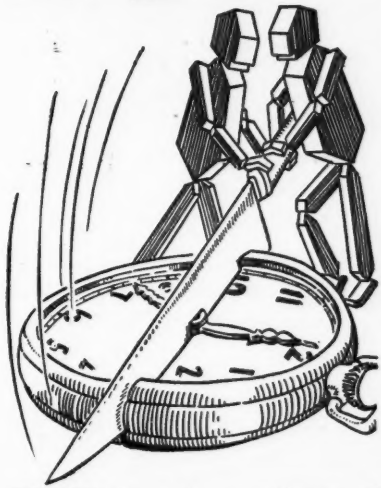
Copy will be sent free upon request to metal-working executives.

"Crawford Ovens". This is the title of a 44-page catalog describing industrial ovens and dryers now being issued by Crawford Oven Division of American Machine & Foundry Co., New Haven, Connecticut. This catalog is in several sections and covers such processes as baking, drying, curing, japanning, enameling, polymerizing, low temperature annealing, expansion heating, wax, asphalt and compound melting, and other processes involving temperatures up to 100 degrees F. Sizes range from laboratory ovens to large conveyor types.

Accepted practices and standard processes are described in detail. Standard size oven and drying units of both the conventional type and "Convector" type are illustrated, described and dimensioned. The "Convector" is especially stressed due to its elimination of all duct work, and its extreme flexibility with respect to air volumes and its adaptability to any source of heat. Twenty-four standard "Convector" sizes are available. Many years of experience in designing, building and installing industrial ovens is evidenced by the great variety of illustrations included in this catalog. A copy will be sent free upon request.

Mention PRODUCTS FINISHING when when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

METSO*
CUTS CLEANING TIME IN HALF!



PROFIT from the experience of a large metal working plant which compared the performance of various cleaners including Metso. Metso excelled them all and resulted in a reduction from ten to five cleaning operations. Rejects were practically eliminated.

Metso's balanced content of efficient alkali and silica insures improved performance and saving.

Get in touch with us about a simple test to prove Metso in your plant.

PHILADELPHIA QUARTZ CO.
General Offices & Laboratory: 125 S. Third St., Philadelphia.
Chicago Sales Office: Engineering Bldg. Stocks in 60 cities.

Originators and Developers
U. S. PAT. 1896707

METSO
SODIUM METASILICATE

the FINISHING forum

Simple Chromic Acid Concentration Tank

By E. A. Blount

ALMOST all chromium plating processes have a rinsing procedure similar to the following:

1. Chromium plate.
2. Cold water rinse in "dragout" tank.
3. Cold or hot water final rinse.

The solution in the "dragout" tank naturally becomes rich in chromic acid and is used as a "solution make up" to be added to the chromium plating tank to replace evaporation losses. However, unless the "dragout" tank is small in proportion to the chromium plating tank, the "solution make up" is not sufficient to use all the solution in the "dragout" tank each day, and this solution increases in concentration from day to day. As the concentration of the "dragout" tank increases, more and more chromic acid is carried out to the final rinse and down the sewer each day. This loss increases in proportion to the increase in the concentration of the "dragout" tank.

In order to use the chromic acid collected in the "dragout" tank, a simple concentration tank can be made. Most plating rooms have one or more hot water rinse tanks of varying size. A small tank can be made to fit in one end of a large hot water rinse tank as shown in Figure 1. The small tank can be constructed of heavy gauge sheet iron and chromium plated or coated with an acid resisting porcelain enamel. Such protection is necessary to

Fig. 1 — Illustration showing construction of a simple chromic acid concentration tank.

prevent the chromic acid from attacking the tank and causing the iron of the tank to go into solution. The concentration tank is kept filled with the solution from the "dragout" tank.

Since the concentration tank is always hot but never boiling, the water evaporates gently, carrying into the air practically no chromic acid fumes. When it is necessary to add "make up solution" to the chromium plating tank, the concentrated solution from the concentration tank is used. Thus, more actual chromic acid and less water is added to the chromium plating tank in the "solution make up". Hence, fresh chromic oxide or chromic acid additions can be reduced, and an increased economy of operation effected. This economy is due to the fact that the solution in the "dragout" tank is kept very dilute and the carry-over of chromic acid to the final rinses is reduced to a minimum.

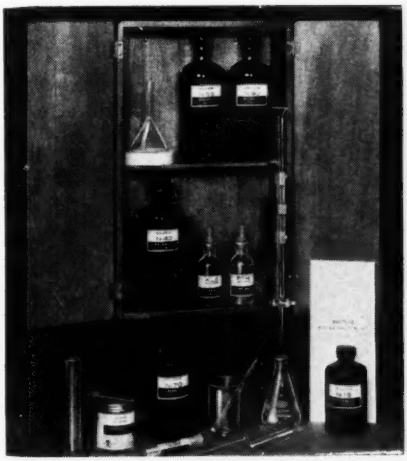
"Finishing Zinc Alloy Die Castings and Rolled Zinc". This is the title of a 24-page bulletin which is now being issued by The New Jersey Zinc Company, 160 Front St., New York, New York. The purpose of this bulletin is to assemble in as complete form as possible the information necessary for the practical plating of rolled zinc and die cast zinc parts. Since the problem of lacquering and enameling die castings has presented itself to many finishers, information on the most desirable methods with which to apply these finishes has been included.

The methods described in the trade literature, which are in successful commercial use, have been tested and the control necessary for the use of these methods has been determined. It has been possible to develop certain simple modifications of well-known practices, which simplify the production of good plated coatings on zinc.

Cleaning has been given particular attention, since many of the difficulties in plating and enameling zinc arise in this operation. It is the belief of the researchers of The New Jersey Zinc Company that the reader will find nothing new or strange in the methods recommended in this bulletin but will find facts of practical help in handling an increasing volume of zinc parts which he is being asked to finish. These methods have, for the most part, been widely used commercially for the last five years with complete success. Considerable work has been done both by The New Jersey Zinc Company and others on the relation of coating thickness to service life. The reader will find reference in this bulletin to substantial changes in practice with regard to the heavier coatings. Copy free upon request.

"Amercoat On Guard Against Corrosion". This is the title of a new 16-page booklet covering a description of, the uses of, and the application procedure necessary for the various types of Amercoat cold-applied coatings, which is now being issued by American Concrete & Steel Pipe Company, P. O. Box 1428, Arcade Station, Los Angeles, California.

These coatings are basically synthetic organic plastic in nature. They contain no paint oils whatever and provide a series of coatings for the resistance to acid and alkali corrosion. These coatings can be used for lining steel containers of concentrated acids and alkalies. Copy free upon request.



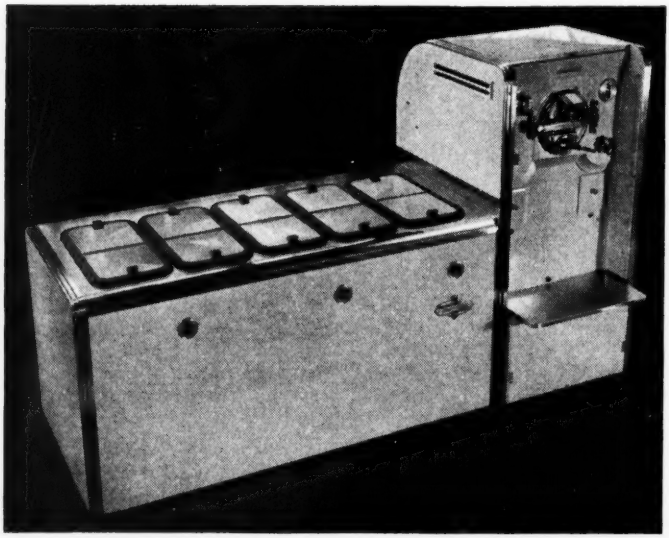
NEW rapid and accurate test sets for brass and copper solutions.
Write for leaflets.
All Types of pH Sets
KOCOUR CO.
4723 S. Christiana Ave., Chicago

FINISHES *that aid in Appearance & Utility*

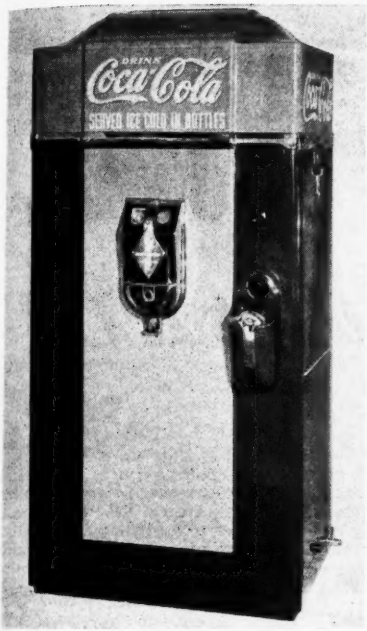
(Right) — This "Victor" Model Bench Grinder which is finished with gray enamel is particularly suited for general grinding, sharpening tools, buffing, polishing and wire brush work.

(Photo Courtesy The Stanley Electric Tool Division)

(Photo Courtesy Ault & Wiborg Corporation)

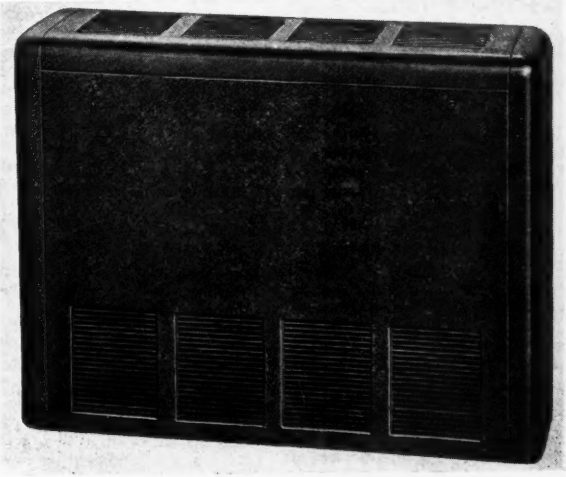


(Left) — The outside surfaces of this counter-type ice cream freezer are finished with "Aulflex". The exposed metal trim is chrome plated.



(Photo courtesy Mills Novelty Company)

(Left)—This Coca-Cola vending unit is finished in the standard red and green colors specified by the Coca-Cola Company. The red and green colors are known as "Aulflex", a finish that requires a primer that is baked for one hour at 340 degrees. Two coats of "Aulflex" finish follow the baking schedule, one baked for one hour at 250 degrees and the second coat which is baked for one and one-half hours at 250 degrees.



(Photo courtesy Young Radiator Company)

(Right) — Illustration showing a forced draft convector made for use in entrance halls and departments where convector appearance is required in addition to unit heater operation. This unit is finished in a smooth crackle finish which is pleasing in appearance and resistant to abrasion.

NEWS of the Industry

Despatch Oven Company Appoints Distributors

According to a recent announcement, Despatch Oven Company, 622 Ninth St., S. E., Minneapolis, Minn., has appointed the Scientific Supplies Company, 123 Jackson St., Seattle, Wash., as exclusive Despatch industrial oven and furnace representatives in the states of Washington, Oregon, Idaho, and Montana.

For a number of years, this firm has been an authorized Despatch laboratory equipment distributor and now with the addition of industrial ovens and furnaces to the laboratory equipment line, they will be in a position to assist with any oven or furnace problem.

Armco Exhibits at the Merchandise Mart

An interesting exhibit of The American Rolling Mill Company, Middletown, Ohio, in the recently opened Home Building Center of Chicago's Merchandise Mart illustrates the various special-purpose metals developed by the company for use in home construction and equipment.

The exterior of the exhibit is composed of steel panels like those used in Steelox houses. Windows are of the double-hung metal type. The room is lined with metal wall panels in natural wood-grain finishes. These support a series of six attractive translite photographs revealing a modern bathroom, kitchen, dining room, recreation and furnace room, laundry room and Armco Galvanized Paintgrip gutters and downspouts.

In the center of the room is a glass case containing cooking-ware, flat-ware, dining room hollow-ware and similar articles made of Armco stainless steel. The bathroom, located in an alcove off the main exhibit, is of sandstone and coral colored formed metal plumbing ware in marine motif.

Eighth Annual Meeting of Porcelain Enamel Institute

The Eighth Annual Meeting and Sales Conference of the Porcelain Enamel Institute will be held in Cleveland at the Hotel Statler, November 16 and 17. This meeting had previously been announced for October 25 and 26.

The executive committee of the Porcelain namel Institute decided to defer this meeting until November due to the rapidly improving business in the porcelain enameling industry. At this November meeting, plans will be laid for promoting the greatly increased business volume which from all indications is apparent for 1939.

Industrial Movie on Wheelabrating

"Wheelabrating — The Modern Airless Method of Abrasive Blasting", is the title of a new industrial movie, (in color) recently completed by The American Foundry Equipment Company, 555 S. Byrkit St., Mishawaka, Indiana.

The film gives a complete pictorial explanation of the Wheelabrator method of abrasive blasting and shows the various types of equipment available for cleaning general and special work in the foundry, forge shop, heat-treat shop and similar plants.

The greater portion of the film is devoted to views of Wheelabrator equipment in operation at such plants as the Buick Motor Co., Chevrolet-Flint, Bendix, Clark Equipment Co., Allis-Chalmers, and Marshall Stove Co.

The types of cleaning demonstrated in the film include: automobile cylinder blocks; brake drums; carburetors; steel, grey iron and malleable castings; heat-treated gears and splines; stove plate; gear forgings; and so on.

Presentations of this film have been made recently at various Foundry and Metal Association meetings in various parts of the country by a company engineer specializing in Wheelabrator development work.

Anyone interested in having a private showing of this movie at his plant or before a trade association meeting can make arrangements by writing the factory.

Tolhurst Moves Credit Department

Tolhurst Centrifugal Division, American Machine & Metals, Inc., 100 Sixth Ave., New York, N. Y., has announced the removal of its credit department to 35 E. Wacker Drive, Chicago, Ill., from East Moline, Illinois. Mr. C. A. Force, credit manager, will remain in charge of the newly located department.

J. W. Meriam of Lincoln Electric Retires After Twenty-four Years Service

An announcement was made recently of the retirement of J. W. Merriam, for the past 24 years vice-president and secretary of the Lincoln Electric Company, Cleveland, Ohio. Mr. Meriam's retirement, at the age of 60, closes a business career which spans the growth and development of the arc welding industry. In 1914 when he joined the Lincoln Electric Company, arc welding was still in the experimental stage.

Although retiring from active service, Mr. Meriam will remain a director of the Lincoln Electric Company. The company's credits and collections will be handled by Frank K. Griesinger. Mr. A. F. Davis, vice-president, was elected secretary.

Detroit Manager Appointed by Worthington

Worthington Pump and Machinery Corporation, Harrison, N. J., announces the appointment of Mr. Ludwig Emde to the position of Detroit district sales manager.

A member of the Worthington organization since his graduation from the University of Michigan in 1930, Mr. Emde is well known in the Detroit district. He will succeed Mr. William J. Daly, recently transferred to the corporation's Philadelphia office as manager.

Allis-Chalmers Appoints Denver District Office Manager

Mr. J. L. Singleton, who has been in charge of the Denver District Office of the Allis-Chalmers Mfg. Co., Greenfield & 70th St., Milwaukee, Wis., has been appointed manager of the Denver office.

Sheffler-Gross Announces Appointment of Distributors

Sheffler-Gross Company, Drexel Bldg., Philadelphia, Pa., takes pleasure in announcing the appointment of Specialty Products Company, Sales Engineers, Boston, Mass., as exclusive distributors in the New England States for Duoflo Suction and Discharge Strainers.

Hilo Makes Appointments to Staff

Mr. Milton T. Vreeland has joined the sales staff of the Hilo Varnish Corporation, 42-60 Stewart Ave., Brooklyn, New York. Mr. Vreeland will operate in the Connecticut territory as well as in part of Massachusetts.

Mr. Max Alberts has also joined the sales staff of the Hilo Varnish Corporation in the capacity of trade sales representative in the State of Texas.

Mr. Roy Teer has been appointed sales representative in New Orleans, La., and vicinity.

Hills Appointed Manager of Distributor Sales for Timken

Yale D. Hills has been appointed manager of Distributor Sales for the Service-sales Division of The Timken Roller Bearing Company, Canton, Ohio, according to a recent announcement. For several years, Mr. Hills has been manager of the Los Angeles territory branch of the Company. Mr. Hills' new headquarters will be located at the main Timken factory in Canton, Ohio.

Mention PRODUCTS FINISHING when writing to advertisers.

At The Metal Show

(Above)—A. H. Prey, Development Engineering Division, The Carborundum Company, and H. J. Wills, Sales Engineering Division, checking "Super-Finished" automobile parts.

(Right)—G. Walters, Advertising Manager, Detroit Rex Products Company, demonstrating the operation of a solvent degreaser. The degreasing unit shown here is a standard model and was built for a permanent display at the Museum of Science and Industry, Chicago, Illinois.

(Below)—E. W. Schweikher, Experimental Laboratory, R. & H. Chemicals Division, E. I. Du Pont de Nemours & Company, conducting a demonstration of the new Du Pont High-Speed Rapid Plating Copper Process. Also R. K. Stoll, Detroit Representative, distributing samples of work plated by new High-Speed Copper Process.

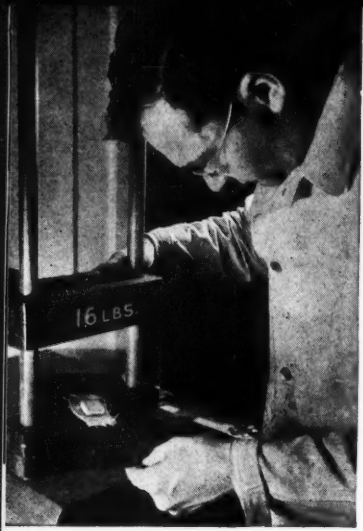
At The Metal Show

(Above)—G. O. Rice, Sales Manager, Parker Rust-Proof Company, Detroit, Michigan, in the foreground and R. A. Foster, Representative, at the right.

(Left)—R. E. Donnelly, Cleveland Representative, Pangborn Corporation, is shown demonstrating the working mechanism of a glass-enclosed Roto-blast.

(Below)—E C. Rinker, Research Division, Oakite Products, Inc., in attendance at the Oakite booth.

OAKITE
MATERIALS . . . METHODS
for every production & maintenance cleaning operation
NATION-WIDE SERVICE PROMPT DELIVERIES
OVER 53 DIFFERENT OAKITE MATERIALS
Let Our 29 YEARS EXPERIENCE HELP YOU SAVE MONEY



NEW Plant equipment and MATERIALS

Miccro Supreme Stop-Off Lacquers

Michigan Chrome Company, 6342 E. Jefferson Ave., Detroit, Mich., has recently developed and placed on the market two new types of stop-off lacquers—one for insulating plating racks for decorative plating and one for masking parts to be hard chromium plated. These lacquers, which are manufactured by a company which has had a background of years of experience in actual plating work, are to be known as "Miccro Supreme Stop-Off Lacquers". These lacquers can be applied directly on a metal surface with no treatment necessary other than a thorough cleaning of the surface to be coated.

Miccro Supreme Stop-Off Lacquers used for insulating plating racks are said to be practically unaffected through the regular cycle of decorative plating. Tests conducted over prolonged periods with an alkaline cleaner at 212 deg. F., showed the coating to be still effective following 500 hours of continuous immersion. A test of this type proves the value of the lacquers for work which may be run through a fully automatic cleaning system or carried on conveyors in cleaning operations.

Other processes in which these lacquers have proved exceptionally effective are concentrated or diluted hydrochloric acid or sulphuric acid dips, cyanide or acid copper baths, standard or bright nickel baths and chromic acid baths. They are also said to be equally impervious to nitric and hydrofluoric acids and proved satisfactory for use with degreasing units.

In use with hard chromium plating processes, the Miccro Supreme Stop-Off Lacquers, while offering exceptional adhesion, can be removed easily after plating, thus permitting thorough cleaning of all parts which have been plated. These lacquers are said to possess rapid air drying qualities. Since edges can be trimmed easily and excess lacquer can be quickly removed with a lacquer thinner furnished by the company, they are said to lend themselves perfectly to accurate

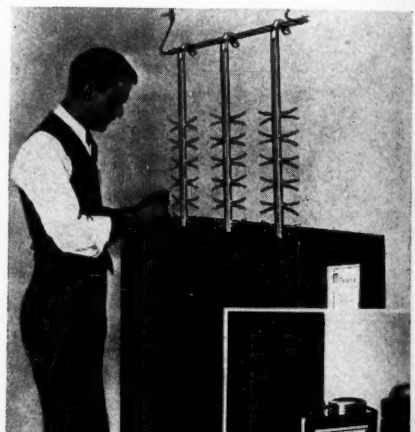


Illustration showing application of Miccro Supreme Stop-Off Lacquer

plating work.

Since the material is absolutely neutral, and not contaminated by acid or destructive substances, there is no possibility of etching in machined parts that have been precision finished during fabrication. These lacquers are recommended for coating permanent hard plating racks.

Among other applications for these lacquers are their use for tank coatings, insulating bus-bars to prevent corrosion, protection of ventilating systems, and as a covering for water lines to prevent sweating or rusting.

Quaker TF-936

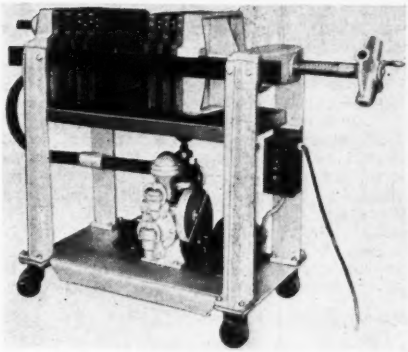
A water soluble hydrocarbon to be known as "Quaker TF-936" has been placed on the market by Quaker Chemical Products Corp., Conshohocken, Pennsylvania. This material is said to have the ability to remove all types of fats and soaps, in addition to mineral oils, and may be used in the processing of metals prior to painting, japanning, Parkerizing, Bonderizing or similar finishing or semi-finishing operations. At the same time, it is said to produce a freely rinsed, clean surface, thereby insuring an adequate bond between the work and finishing material.

Quaker TF-936 can be used in either tanks or washing machines. No alkali or alkali salts are required and there is said to be no danger of white formation building up on the work or of alkali sweating out at seams to cause blistering and peeling. A slight film remains on the work, which after cleaning is sufficient to prevent rusting of the work in transit through the plant or for short stocking periods.

Shriver Portable Filter

A compact filter unit has been developed for the filtration of electroplating solutions which are injurious to or contaminated by metals and is now being marketed by T. Shriver & Company, 808 Hamilton St., Harrison, New Jersey. The operating mechanism of the filter is made of semi-hard rubber, thereby making it particularly useful for solutions such as bright nickel, acid copper, cyanide copper and sodium and potassium silver solutions.

The unit illustrated herewith consists of alternate filter plates and frames, 12 in. square, assembled on side bars to make a 6 chamber filter with a total filtering area of 5½ square feet and a conservative filtering capacity of 135 gallons per hour. Increased filtering capacity may be obtained by adding plates and frames to increase the number of filter chambers at an increased rate of 20 to 25 gallons per chamber.



Shriver Portable Filter

The plates are clothed with either cotton, twill or wool cloths depending upon the nature of the solution to be filtered. In order to facilitate cleaning, filter paper is placed over the cloth, thereby permitting quick and easy strip-

If you have a finishing problem of unusual difficulty.

If you are interested in checking your present schedule for economy.

If you are merely curious as to what we have to offer

WRITE

The Varnish Products Co.

5208 Harvard Ave. Cleveland, Ohio

Clear Lacquers—Etching Lacquers—Heat-proof White—Bronzing Vehicles—R-700—CEL-U-LAK Primers and Surfacers—Lacquer Enamels — Lacquer Cements — SPECIALTIES.

ping of the paper together with the solids in the filter frame, from the cloth and recovering with fresh paper. The entire opening, cleaning and closing procedure is thus accomplished in minimum time.

The filter is fed by a Shriver Duplex Diaphragm Pump with rubber lined liquid ends, valves, feed and discharge with rubber hose connection to the filter. The pump is connected direct to a standard ¼ h.p. motor.

The unit is mounted on a portable stand which is equipped with heavy swivel type casters. The entire unit is 35 in. long, 21 in. wide and 36 in. high.

Boothcote

A coating material for use on paint-spray booth walls which is said to prevent the adherence of paint to be known as "Boothcote" has been placed on the market by Harris Soap Co., 17 Stetson St., Buffalo, New York. Boothcote can be applied to the paint-spray booth by means of a standard spray gun or a brush. The material when applied on the clean booth walls prevents accumulation of paint on the walls and permits stripping of the paint in sheets at the end of an operating period.

Boothcote is said to have a consistency similar to paint and is available in 5-gallon pails and 30-gallon drums.

M. S. A. Explosimeter

Mine Safety Appliances Company, Braddock, Thomas and Meade Sts., Pittsburgh, Pa., recently placed on the market the M. S. A. Explosimeter, a pocket-sized instrument for quickly and easily determining the presence of combustible gas hazards.

M. S. A. Explosimeter

The M. S. A. Explosimeter is designed to meet the demand of operating men for an instrument that can be carried about on the job and operated by any workman. It shows whether gas concentrations are within or above the explosive range. In size and weight, the M. S. A. Explosimeter compares with a small folding camera, and can be carried either in a pocket or on a shoulder strap.

Dependability, compactness, and easy operation give the Explosimeter a wide range of application. Some of the fields in which it is now being used include: Distilleries, Public Utilities, Oil Refineries, Paint and Varnish Plants, Iron and Steel Mills, Chemical By-product Plants, and so on. It is especially well adapted to use by municipalities for investigating fire hazards, testing sewers, manholes and checking for gas hazards in sewage disposal plants.

Copies of an interesting and well illustrated bulletin on the M. S. A. Explosimeter are available by addressing Mine Safety Appliances Company, Braddock, Thomas and Meade Sts., Pittsburgh, Pennsylvania.

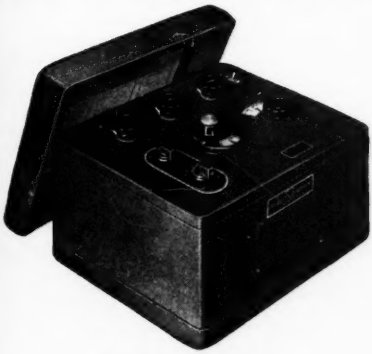
Improve Your Finish 100%

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

Wm. A. Juergens Co.
4036-40 Lagrange Street,
Toledo, Ohio, U. S. A.
If your dealer does not carry Magic Tack Rags, write us for sample.

Cameron pH Meters

A pH meter, to be known as the "Cameron," has been recently placed on the market by Wilkens-Anderson Co., 111 North Canal St., Chicago, Illinois. The Cameron pH Meter is portable and



Cameron pH Meters

is said to eliminate guesswork through direct and continuous pH readings.

Absolute confidence in results is assured as the basic calibration is against a genuine Eppley Standard Cell. The Cameron is designed to deliver 24-hour service and to retain top operating accuracy and sensitivity month after month. The continuously indicating potentiometric circuit avoids repeated tapping and adjustment for null point and the smooth vernier action of the pH dial is swift and sure.

The amplifier system operates at peak efficiency at all times and eliminates inaccurate results. Steady current from a storage battery is used. Readings are always directly in pH units and only the glass electrode may be used in oxidizing or reducing solution, colored and turbid liquids, suspensions and so on. Cameron electrodes are available in many new forms, for handling any quantity of solution from drops to liters.

Plast-O-Line Tank Lining

A chemical tank lining designed for use where flexibility and resistance to temperature are required, to be known as Plast-O-Line, has been placed on the market by Heil and Company, 3082 West 106th St., Cleveland, Ohio. The manufacturer is equipped to furnish complete lined tanks to specification or is prepared to line old tanks on location. Brick sheathing is also supplied.

Plast-O-Line is a black thermo-plastic material particularly adapted for use on metal. It can be applied in thicknesses from ⅛ in. to ½ in. Plast-O-Line is said to form a flexible lining which is resistant to temperatures up to 212 degrees F. It is said to be a non-conductor of current, possess low thermal conductivity, and is not effected by sudden temperature changes.

Plast-O-Line is recommended for acid tanks (except chromium and hydrofluoric), plating solution tanks with the exception of chromium, and metal pickling solution tanks.

"Standard" Exhauster Equipment

The Standard Electrical Tool Company, Eighth & Evans Sts., Cincinnati, Ohio, announces an exhauster which can be adapted to any make of grinding, buffing or polishing machine. The exhaust blower is powered by a 3600 r.p.m. motor, the motor and blower being mounted on a common base and attached to the back of the pedestal. The blower motor is controlled by a separate push button manual starter at the front of the pedestal. If preferred, the blower motor and buffer motor may be connected so that the two units operate simultaneously

absolutely uniform!

"INDIAN BRAND" TURKISH EMERY

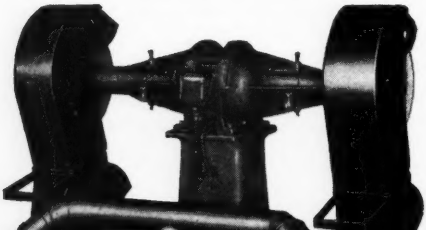
You can depend on "INDIAN BRAND" grains for absolute uniformity . . . highest quality . . . greater capillarity and longer wear. Any size or quantity ready for immediate shipment.

FREE — Trial Lot

"INDIAN BRAND" TURKISH AND NAXOS EMERY
"HECCO BRAND" AMERICAN EMERY

HAMILTON INDIAN BRAND
EMERY & CORUNDUM CO.
CHESTER • MASS.

through the magnetic starter located in the base of the machine. The unit is furnished complete as illustrated, including adjustable hoods and the necessary piping.



Rear View of Standard 2 H.P. Polishing and Buffing Machine Showing Exhauster Equipment

The blower was developed to provide for the collection of dust and refuse from grinding, buffing and polishing equipment when the location of the machine is remote from the regular exhaust system. An air filtering stand is available for connection to the exhaust blower. This stand is located at the rear of the machine and collects all refuse while the air leaves the stand in a clean condition.

Matthews Paint Spraying Equipment

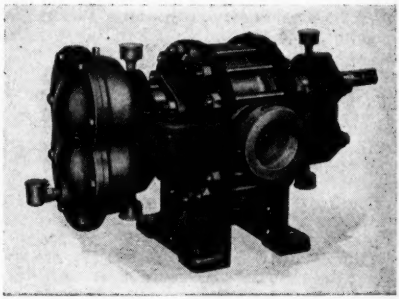
A paint spray unit which delivers fan shaped spray by centrifugal force has been placed on the market by Jas. H. Matthews & Co., 3404 Forbes Field, Pittsburgh, Pennsylvania. The spray can be adjusted to widths between 1 and 18 inches and is free of paint fog.

Drive is obtained by means of a 1/10 h.p. motor and the paint is held in a 3-pint container adjacent to the drive. The motor operates at 112 volts A.C. or D.C. The complete unit weighs 5½ pounds. The unit can be used to apply practically any type of paint. According to the manufacturer, an operator can paint approximately 1,500 square feet of surface per hour by means of this spray gun.

Worthington Rotary Pump for Viscous Chemicals

A complete line of specially designed rotary pumps for viscous chemicals is now being marketed by Worthington Pump and Machinery Corporation, Harrison, N. J. These pumps are ruggedly constructed to efficiently transfer such liquids as sulphonated oils, mineral oils, greases, and so on.

These pumps are available in iron, bronze, Monel, nickel, Everdur, stainless steel, aluminum, and so on, for capacities up to 700 g.p.m., pressures up to 150 lbs. per sq. in., and viscosities up to 500,000 SSU.



Worthington Rotary Pump for Viscous Chemicals

Sterling Automatic Valve Control

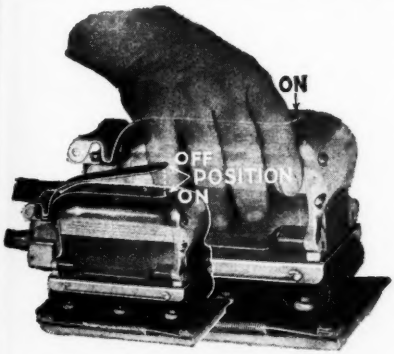
Thousands of cubic feet of air are said to be wasted daily in plants throughout the country because operators of pneumatic tools neglect to stop their machines while changing operations. The Sterling Products Company, 2457 Woodward Ave., Detroit, Mich.,

METALPREP
"Used First — Makes Your Paint Finish Last"
METAL FURNITURE MFRS: MAKE YOUR METAL SAFE FOR PAINT
Use Metalprep to clean and prepare all sheet metal surfaces before painting. Removes rust and grease.
Write for Literature
NEILSON CHEMICAL CO.
6564 BENSON ST. DETROIT, MICH.

has developed a unique automatic valve control for use on the Sterling Speed-Bloc Sander. Without thought or effort on the part of the operator, this device automatically starts and stops the sander and controls the flow of water when the hose is attached for wet sanding.

Low air consumption is one of the outstanding features of the control. It is claimed that the use of bar stock, aluminum pistons and expander rings mounted behind the piston cups in the latest model reduce air consumption to approximately 5½ cu. ft. per minute under full load at speeds of 3000 oscillations per minute. Tests conducted by the manufacturer indicate that air wasted will approximate 15 to 35 per cent of the air consumed in the operation of the machine. This waste is said to be eliminated through the use of the automatic valve control.

In addition, operating efficiency is materially increased by providing freedom of both hands to operate the machine and manipulate the product being sanded or rubbed. This feature is particularly desirable on gas sanding and rubbing applications which necessitate freedom of workmen's hands for applying compounds, gasoline, benzine, oil and so on.



Sterling Automatic Valve Control

The control is designed to fit all models of Sterling sanders and is quickly installed by simply removing the hand-operated air and water cams. The same holes that hold the cams are used to install the automatic control.

Ideal Electric Etcher

A tool for making positive, permanent identification to be known as the "Ideal Electric Marker" is now being manufactured by Ideal Commutator Dresser Co., 4004 Park Ave., Sycamore, Illinois.

Ideal Electric Etcher

The Ideal marker can be used to cut names, sizes, numbers, models and other information on steel, iron, bronze, glass, bakelite, and other surfaces. The unit operates at a speed of 7200 cutting strokes per minute, cutting into the surface of the material and leaving a clear, legible imprint. The marking point is a diamond and is said to permit marking extra-hard materials up to 60 Rockwell hardness.

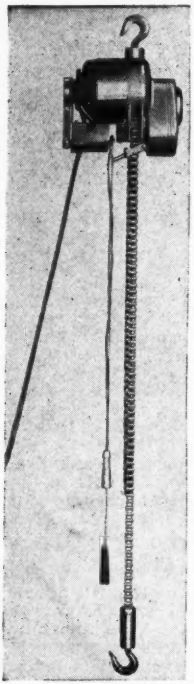
"Budgit" Light Weight Portable Electric Hoist

A light-weight portable electric hoist of 500 lb. lifting capacity has been placed on the market by Shaw-Box Crane and Hoist Division, Manning, Maxwell & Moore, Inc., Muskegon, Mich., under the trade name "Budgit".

The hoist is believed to be the first electric hoist that weighs less than a hand-operated spur geared chain hoist of equal capacity. Complete, it weighs 58 lbs. Operating from lighting sockets no additional wiring or special conductor systems are required for installation.

The hoist is regularly equipped with sufficient lifting chain to give a lift of

Borolon TRADE MARK ABRASIVE POLISHING GRAIN
Strictly first quality aluminum oxide abrasive grain manufactured in our own electric furnace plant. Specially prepared and treated for most efficient polishing performance. Write for samples.
ABRASIVE COMPANY GRINDING WHEEL AND ABRASIVE DIVISION OF SIMONDS SAW AND STEEL CO. PHILADELPHIA, PA.



"Budgit" Light Weight Portable Electric Hoist.

10 ft. additional lift and is possible by lengthening the lifting chain. The distance between the upper hook and the load hook when in its highest position is only 16 in. The lifting speed with 500-lb. load is 17 ft. per minute.

Included in its design are several interesting safety features, among which are a convenient "one hand" control; safety stops that prevent overtravel of the hoist hook in both the hoisting and the lowering directions, a spring cushioned load hook that absorbs impacts, a provision that prevents overloading the hoist more than 10 per cent beyond its rated capacity, and an arrangement whereby the load may be lowered by gravity or power under perfect control.

To obtain the performance indicated, advantage has been taken of practices and materials that are new to hoist construction. Roller chain instead of the usual link chain is employed. Gears and pinions are made from alloy steel with machine cut teeth and are heat treated. Load shaft is made from nickel steel. Needle type roller bearings are used at all bearing points.

Mechanically, this hoist is of simple design. The gear train consists of only two gears and pinions. In design the hoist is totally enclosed, with the gearing operating in an oil bath.

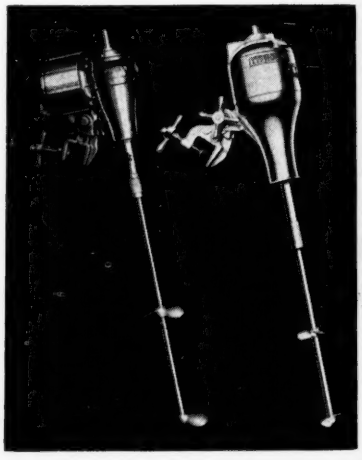
Du Pont Carbonate Remover

A carbonate remover consisting of calcium sulphate of a high degree of purity developed to eliminate the need for "freezing out" or for using barium cyanide or chloride to remove carbonates from cyanide solutions has been placed on the market by the Electroplating Division, E. I. Du Pont de Nemours & Co., Inc., Wilmington, Delaware. The Du Pont Carbonate Remover is designed to remove carbonates by precipitation in the form of an insoluble carbonate, the precipitate to be inert or beneficial.

Du Pont Carbonate Remover has a relatively light solubility in the solution, which is said to diminish the introduction of deleterious impurities. The remover can be maintained in stock at all times, thus permitting continuous removal of carbonates as they are formed. It is also said to enable platers to operate their solutions continuously through the hot summer months.

Patterson Typhoon Portable Mixers

The Patterson Typhoon Portable Type Mixers which are now being marketed by The Patterson Foundry & Machine Company, East Liverpool, Ohio, are said to provide high speed mixing and blending of all bases and liquids without contamination danger. The units are constructed of highly polished aluminum chrome and stainless steel.



(Left)—Patterson Typhoon Portable Geared Model Mixer (Right)—Patterson Typhoon Portable Direct Drive Model Mixer

The Direct Drive Model is for light and medium liquids. An all-aluminum motor frame and housing are used. Adjustable shaft and propellers are provided. The Direct Drive Model is equipped with a fan-cooled motor and can be used for capacities up to 2500 gallons.

The Geared Model is for use with me-

dium and heavy liquids and concentrates. An aluminum frame motor is built into the silent, spiral gear reducer case. The Geared Model can be used on capacities up to 3000 gallons.

Seitz Tank Furka

A filter which incorporates a cylindrical filtering unit to be known as "Seitz Tank Furka" has been placed on the market by American Seitz Filter Corporation, 480 Lexington Ave., New York, New York. The cylindrical filtering feature is said to provide a large filter surface in a compact container.

By employing the alluvial or pressure leaf system, the Seitz Tank Furka assures a sharp filtration of liquids with

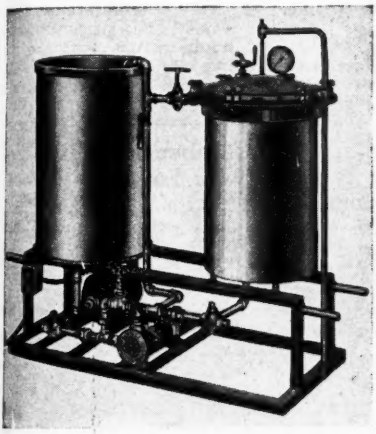


Illustration showing a complete Seitz Tank Furka unit

any degree of viscosity or turbidity, since different grades of asbestos, filter-aid or charcoal may be used in any combination to meet the special requirements of the liquid being filtered. The filtering medium is said to set instantly and have a long run of crystal-clear filtrate. The exhausted filter layer can be easily "peeled off" the cylindrical frame in one sheet.

The standard construction of the Seitz Tank Furka filter includes a tank of nickel-lined steel, heavily tinned bronze filter frames, monel screens, and fittings, pipings and connections of tinned bronze. Any other types of metal are available when specified. All models are offered either as a single filter unit, or as a complete set-up with filter, mixing tank, pump and motor on a movable carriage.

Benjamin "Silvered Bowl" Diffuser

A lighting reflector specifically designed to utilize the indirect lighting characteristics of the silvered bowl Mazda lamp, and thus provide a maximum degree of eye comfort, to be known as Benjamin "Silvered Bowl" diffuser, has been placed on the market by the Benjamin Electric Mfg. Co., Des Plaines, Illinois.

This type of Benjamin lighting unit is especially adaptable to the finishing department and particularly the inspection work where an abundance of non-glare light is essential.

The Benjamin "Silvered Bowl" Diffuser is a unit which is said to make effective use of the silvered bowl lamp by a distinctive innovation in the diffuser design. Through the proper combination of porcelain enamel and Alzak aluminum reflecting surfaces and the use of the silvered bowl lamp, a softer illumination is obtained without sacrificing high lighting efficiency.

The three essential elements in the new Benjamin "Silvered Bowl" Diffuser are the silvered bowl lamp and the porcelain enamel reflecting surface with a semi-specular Alzak aluminum reflector insert. The Alzak aluminum reflector is located in the top of the unit and redirects the light from the silvered bowl lamp downward and outward in a manner which avoids interception of the light rays by the lower edge of the porcelain enamel reflector.

Alzak aluminum being a semi-specular reflecting surface produces a light zone of high intensity. The light in this zone is softened and diffused by the action of the porcelain enamel reflecting surface comprising the bowl of the reflector. This porcelain enamel reflecting

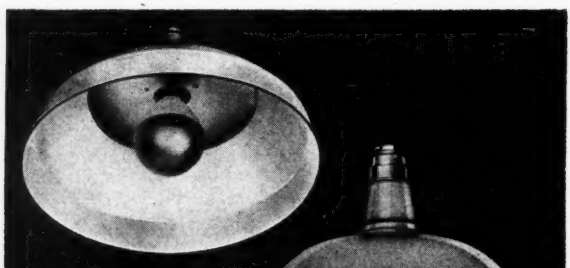
A COMPLETE SERVICE
To Manufacturers of Metal Articles

LUPOMATIC can furnish you with Equipment, Formulae, Engineering Service to polish completely automatic any metal article you manufacture.

The highly developed LUPOMATIC System produces a finish superior to hand polishing at a saving of as much as 92%.

Write today to Dept. L for details on your particular requirements.

LUPOMATIC TUMBLING MACHINE CO. INC.
4511 Bullard Ave. New York, N. Y.



Benjamin "Silvered Bowl" Diffuser

surface also serves to greatly soften shadows and minimizes glare.

In this Benjamin unit, the silvered bowl lamp produces a broader candlepower distribution with a minimum of direct or indirect glare. Due to the opaque section of the silvered bowl lamp and the deep overhanging skirt section of the porcelain enamel reflector, the filament or other high-brightness portions of the lamp are shielded from all normal angles of vision. This unit meets all the specifications of the RLM Standards Institute and bears the RLM Label of compliance. The units are available in Socket Reflector and Turnlox type of hood construction.

National Water Heater

A water heater, in which cold water contacts steam coils within a chamber, has been placed on the market by National Pipe Bending Co., 55 River St., New Haven, Connecticut. The cold water enters through an inlet located in the bottom of the chamber, passes through a short tube and into an inner chamber containing steam coils. This chamber is arranged so that incoming water is forced to make direct contact with the heating coils before being delivered to the main storage portion of the heater which is located at the top of the chamber. Stored water that cools flows to the bottom of the tank and is drawn up through the heating chamber through an annular opening in the inlet by the action of the incoming water which sets up circulation in the main chamber.

The steam coils consist of a series of return bends joined to a heater outside the tank. The supply connection is located at the top and the exhaust at the bottom. A hot water outlet from the tank is located at a connection on top of the tank.

Provision is made to insert a thermometer near the hot water outlet, and a thermostat in the end of the tank above the steam connection. When exhaust steam is used as the heating medium, the heater can be specified with a booster unit at the hot water outlet to utilize live steam and raise the outlet water temperature when an additional heating effect is desired. The National Water Heater is available in a range of sizes.

Carpenter Rubber-Seal Dipping Basket

Illustrated herewith is a dipping basket which is constructed of metal and covered with pure rubber which has been placed on the market by The

Carpenter Rubber-Seal Dipping Basket

Carpenter Metal Products Company, 446 East 131st St., Cleveland, Ohio. The rubber-seal overcoat is said to resist acid corrosion and will not readily peel or crack. This type of basket is said to be ideal for handling parts to be cleaned where rapid draining is required. The size of the perforations of this type of basket vary according to the contents. The gauge of the metal also varies and is available in any gauge according to requirements.

The handles of this basket are securely welded to the sides of the basket. The handles extend to the bottom of the basket and are sufficiently long enough so that work can be easily emptied from the basket without injury to the operator's hands.

Acid Resisting Coating

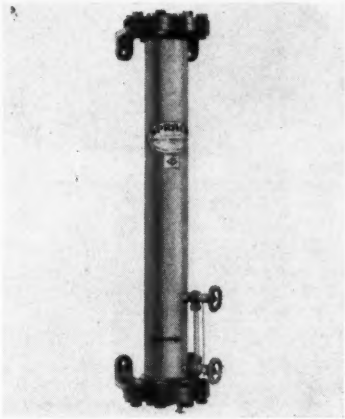
A metal coating for protecting metal from acids and alkalies has been placed on the market by Wilbur & Williams Co., 401 Park Square Bldg., Boston, Massachusetts. The surface protected by the coating can be immersed in any of the common commercial acids or alkalies without being affected. The coating is a black resin compound, and can be applied by brush. The material dries to a black semi-gloss finish that remains hard at 212 degrees F. Above this temperature it softens, but remains useful to a temperature of 400 degrees F.

A recommended application of this metal coating is three coats. Normal drying time between coatings is approximately 12 hours. In addition to protecting the metal against acids and alkalies, this coating is said to be resistant to chlorine gases and alcohol. It is supplied in 1-gallon cans, 5 and 30-gallon drums.

Spraco Oil and Water Extractor

Designed to keep compressed air lines free from oil and moisture, the latest model Spraco Oil and Water Extractor, manufactured by Spray Engineering Company, 151 Central St., Somerville, Mass., is said to be maintenance-free, since it has no moving parts or packing and requires no adjustments. An automatic drain valve prevents the accumulation of condensate in the reservoir at the bottom of the extractor shell.

Elimination of moisture and free oil is obtained by the cooling effect of a small volume of circulating water passing through a cooling coil, by a reduction in the air velocity through the extractor, and by changes in the direction of air flow. Oil and water are collected



Spraco Oil and Water Extractor

on a series of baffles in the air stream, deposited in the reservoir and automatically drained off.

The Spraco Oil and Water Extractor is available in sizes for 40 and 100 cfm. Larger capacities are provided by multiple units.

Paasche Type F708 Superior Single Pad Airrubbing Machine

A small, light, easy-to-handle airrubbing machine, to be known as the "Type F708" has been placed on the market by Paasche Airbrush Co., 1910 Diversey Parkway, Chicago, Ill. The Type F708 is of rigid and durable construction. This type of airrubbing machine is designed to be used in vertical, horizontal, or any other position. It is light

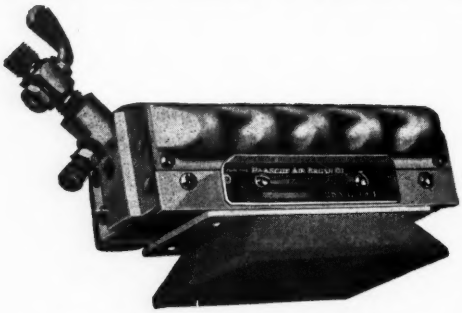
For a real good polishing job use

KEYSTONE EMERY

TURKISH—NAXOS—AMERICAN

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

in weight and is also said to be indispensable for rubbing, polishing, or sanding trims, moldings, legs, novelty



Paasche Type F708 Superior Single Pad Airrubbing Machine

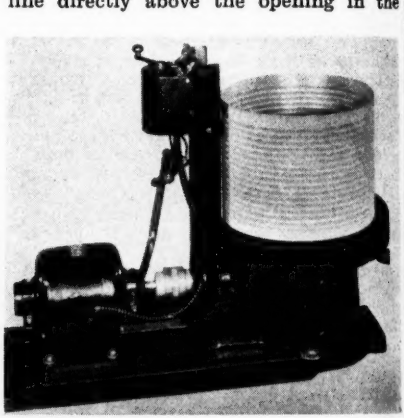
and juvenile furniture, chairs, auto bodies, and so on. By using a deep, soft felt pad, irregular and curved surfaces may be rubbed or sanded.

Curved surfaces such as auto hoods, radiators, machinery, and so on, are rubbed down by simply guiding the air-rubbing machine around and over the surfaces. This type of machine requires

8 cu. ft. of free air per minute at 80-pounds air pressure to operate at 1600 strokes per minute. The overall size is 7 in. long, 3¾ in. wide, and 3¼ in. high.

Mercil Type Centrifugal Dryer

Centrifugal drying of metal products and parts can be effectively accomplished by means of the Mercil Type Centrifugal Dryer manufactured by Hanson-Van Winkle-Munning Co., Matawan, New Jersey. As shown in the illustration, the construction includes a Garden City blower which is connected directly to a ¼ h.p. motor. A 6 inch pipe line is welded to the cover and extends over to the blower to a point where it can swing out in a horizontal position. The cover is simply lifted and swung out of the way when the basket is loaded or unloaded of work. The electrical heating elements are inserted in the pipe line directly above the opening in the

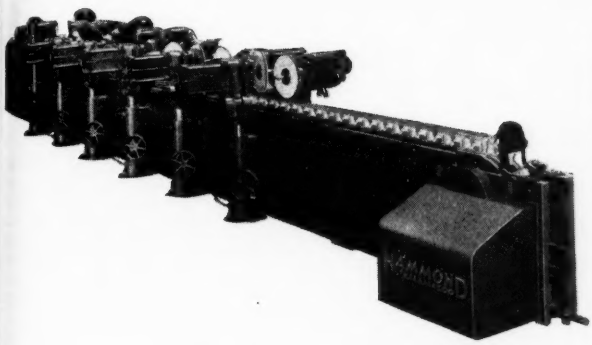


Mercil Type Centrifugal Dryer operating at 600 r.p.m. Note the absence of vibration.

cover. The effect of the combination of the Mercil Dryer and the electric drying unit is to dry a bath from 30 to 60 pounds of small work in one to two minutes.

Automatic Molding Polishing and Buffing Machine

The Strait Line Automatic Polishing and Buffing Machine was designed and



Automatic Molding Polishing and Buffing Machine

built by Hammond Machinery Builders, Inc., Kalamazoo, Michigan, for the purpose of polishing and buffing running board moldings. The machine is 42 in. long overall and has 12 heads, each head being powered by a 7½ h.p. motor.

This type of polishing and buffing machine can be furnished with any number of heads depending upon the customer's requirements, thereby increasing or shortening the length of the machine. This particular model has motor on spindle heads and the speed is limited to the motor speed. At the same time, belted heads are available if desired which provide any speed within a certain range.

The wheel heads are balanced, thus insuring uniform wheel pressure and are adjustable from horizontal to vertical wheel positions. Spindles are mounted on anti-friction sealed bearings.

A series of cast iron platens are mounted on ball bearings and travel over steel ways. They are connected to a heavy conveyor chain which is driven by a variable speed unit. Each motor is connected with an individual switch, but the machine is also wired with one safety switch which will stop all motors and the drive if necessary.

All moving parts are protected so that dirt and abrasive material cannot come in contact with any wearing part.

"Triad WS Spray Booth Cleaner". This is the title of a bulletin which is now being issued by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Michigan. Triad WS is said to make possible the complete control of paint pigments and other ingredients. Plugging of the lines, pumps, spray nozzles, and eliminators is also said to be prevented. By varying the concentration of Triad WS in the system to suit the particular paint used, paint materials are floated on the top of the supply tank. By means of this procedure, the clean solution is drawn from the bottom of the tank, eliminating the possibility of fouling any working parts. The paint which is removed at periodic intervals can be reclaimed for further use. Since effective coagulation is accomplished at low concentration, the difficulty of excessive foaming and the danger of caustic burns is said to be eliminated.

A copy of "Triad WS Spray Booth Cleaner" will be sent free upon request.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

Check in ✓ DE-WITT OPERATED HOTELS
Genuinely Friendly
In CLEVELAND it's
✓ The HOLLENDEN
In COLUMBUS it's
✓ The NEIL HOUSE
In AKRON it's
✓ The MAYFLOWER
In TOLEDO it's
✓ The NEW SECOR
In JAMESTOWN, N. Y., it's
✓ The Jamestown and
✓ The SAMUELS

for your CATALOG *library*

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Miccro Supreme Stop-Off Lacquers
A 4-page folder describing stop-off lacquers for insulating plating racks used in decorative plating and for masking parts to be hard chromium plated now being issued by Michigan Chrome Company, 6342 E. Jefferson Ave., Detroit, Mich.

2. Metal Finish
"The Answer Is Polymerin" describes in detail the wide applications of Polymerin to interrelated research through which this finish was developed. Ault & Wiborg Corporation, 75 Varick St., New York, N. Y. See pages 3 and 4.

3. Industrial Ovens
A method whereby oven costs can be reduced, the production improved and oven operations accelerated is described in the 4-page catalog now being issued by The Kirk & Blum Manufacturing Co., 2816 Spring Grove Ave., Cincinnati, Ohio. See Second Cover.

4. Weather-ometer
Full details on accelerated laboratory tests on small samples of paints, lacquers, and so on are described in the bulletin being issued by Atlas Electric Devices Co., 361 W. Superior St., Chicago, Ill.

5. Industrial Ventilation
Examples and typical applications of industrial ventilation by means of Shut-O-Vent fans is being issued by Reed Unit-Fans, Inc., New Orleans, La.

6. Technical Information on Monel, Nickel and Nickel Alloys
The properties and uses of Inconel are concisely described in this catalog which is now being issued by the Development and Research Division, The International Nickel Company, Inc., 67 Wall St., New York, N. Y.

7. Metal Cleaning
Metal cleaning with Wyandotte products is described in this 40-page illustrated catalog. The service that is available to those plants using the Wyandotte products is fully explained. The J. B. Ford Company, Wyandotte, Mich.

8. Parker Processes
Parker Rust-Proof Company, 2172 East Milwaukee Ave., Detroit, Mich., is now issuing a new booklet describing various applications of their unique processes of Parkerizing and Bonderizing, their rust preventive processes. This very attractive two-color booklet describes these two processes and cites many instances when they have solved the rust preventive problem.

9. Steam Specialties
Illustrated with 22 actual examples, this booklet outlines a practical method for judging how well steam specialty equipment is made to give long service without repairs. The International Nickel Company, Inc., 67 Wall St., New York, N. Y.

10. Plating Barrel
The Udylite Plating Barrel is completely detailed in a bulletin published by the Udylite Company, 1651 E. Grand Blvd., Detroit, Mich. See page 23.

11. Spray Booths and Ovens
Newcomb-David Company, Inc., 5741 Russell St., Detroit, Mich., has issued a 24-page catalog illustrating and describing typical N-D Spray Booths, Industrial Ovens, Metal Booths, Washers and Ventilating Equipment.

12. Black Finish To Steel
A 4-page bulletin outlining the Pentrate Process of applying an attractive, low-cost black finish to steel, through a process of chemical action. Heatbath Corporation, Springfield, Mass.

13. Metal Cleaning Hints
An interesting bulletin giving details on Metalprep Rust and Grease Remover. Tells how Metalprep makes metals safe for paint. Neilson Chemical Co., 6564 Benton St., Detroit, Mich. See page 54.

14. Materials Handling Equipment
An interesting folder describing Cleveland Tramrail as part of the processing equipment and its application in handling raw materials, semi-finished pieces, sub-essemblies, and so on, and carrying them away just as fast as the machine will produce or finish individual pieces or container loads. The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

15. Automatic Polishing Machines
The Packer Machine Co., Meriden, Conn., has issued a catalog illustrating and describing the Packer line of automatic polishing and buffing machines.

16. Industrial Ovens
Two new bulletins giving full particulars on air heaters and industrial ovens. J. O. Ross Engineering Corporation, 350 Madison Ave., New York, N. Y. See Third Cover.

17. Alkali Cleaning Compounds
A new bulletin has been released by Detroit Rex Products Co., 13017 Hillview Ave., Detroit, Mich., describing Triad Alkali Cleaning Compounds.

18. Production Polishing Equipment
New bulletins have been issued, giving descriptions and specifications of various types of production polishing machines. Acme Manufacturing Co., 1641 Howard St., Detroit, Mich.

19. pH Test Paper
Hydrion Bulletin describing wide range pH test paper which gives five distinct color ranges in range pH 2 to pH 10. A generous supply of sample test papers is included. R. P. Cargille, 118 Liberty St., New York, N. Y.

20. New Wrinkles
A 12-page catalog published by New Wrinkle, Inc., Mutual Home Bldg., Dayton, Ohio, describing in detail the various types of wrinkle finishes available for product finishing.

Print plainly in filling out coupon for literature.

PRODUCTS FINISHING
431 Main St., Cincinnati, Ohio

I am interested in receiving the following literature reviewed in your November issue.

No..... No..... No..... No..... No.....
(Insert numbers denoting literature you want.)

Name ..... Title.....

Company .....

Company Address .....

City ..... State.....

INDEX *to advertisements*

Abrasive Company	55
Abrasive Products, Inc.	4
American Air Filter Co., Inc.	6
Ault & Wiborg Corporation	2-3
Barlum Hotel	60
Bias Buff & Wheel Co., Inc.	31
DeWitt Operated Hotels	61
Egyptian Lacquer Mfg. Co.	17
Hamilton Emery & Corundum Co.	53
Harshaw Chemical Co., The	38
Jackson Buff Corporation	32-33
Juergens Co., Wm. A.	52
Keystone Emery Mills	59
Kocour Co.	43
Kirk & Blum Mfg. Co.	Second Cover
Lupomatic Tumbling Machine Co.	57
Mahon Company, The R. C.	Fourth Cover
Neilson Chemical Co.	54
Norton Company	29
Oakite Products, Inc.	1
Philadelphia Quartz Co.	41
Pulmosan Safety Equipment Corp.	13
Ross Engineering Corp., J. O.	Third Cover
Stanley Chemical Co.	27
Udylite Company, The	23
Varnish Products Co., The	51

PRODUCTS FINISHING
PUBLISHED BY GARDNER PUBLICATIONS, INC.
431 MAIN STREET • CINCINNATI • OHIO